

**CERTIFICATE FOR ENERGY-ENVIRONMENT-GREEN AUDIT PROCESS**

This is to certify that, we have conducted an **ENERGY-ENVIRONMENT-GREEN AUDIT** in **NANDHA ENGINEERING COLLEGE (AUTONOMOUS)**, Erode - Perundurai Main Road, Vaikkaalmedu, Erode - 638 052, Tamil Nadu, India on 05 APRIL 2017. The description of the audit process is given below.

S. No.	Description	Parameters
1.	Present Annual Energy Consumption	3,48,025 kWh + 39,780 kg of LPG
2.	Proposed % of Energy Savings	10.0 % Electrical + 5.0 % LPG
3.	Proposed Annual Energy Savings	34,803 kWh + 1,989 kg of LPG
4.	Proposed Financial Savings	Rs. 4.1 Lakhs
5.	Initial Investment Required	Rs. 6.0 Lakhs
6.	Simple Payback Period	Nearly 1.5 Years

Analysis of Environment Audit Process and CO₂ Balance Sheet:

S. No.	CO ₂ Emission (Tons/Annum)			CO ₂ Neutralization (Tons/Annum)		
	Description	Annual Usage	CO ₂ Emission	Description	Annual Usage	CO ₂ Neutralized
1.	Diesel	2,02,278 Litres	534.0	Solar Thermal System	14,470 kWh	11.9
2.	Electrical Energy	3,48,025 kWh	285.4			
3.	LPG	39,780 kg	119.3	Mature Trees	324 Nos	7.1
4.	Wood	131 Tons	249.3			
5.	Total Emission		1,188.0	Total-Neutralized		19.0
Balance CO₂ to be Neutralized = 1,168.0 Tons/Annum						

Recommendations of the Audit Process:

1. Reduce the LPG consumption by regularly clean the burners
2. Decrease the LPG consumption by arresting the leakages on the distribution pipes.
3. Foot valve of all the submersible and open well pipes must be cleaned at regular intervals and this ensure i) free flow of water and ii) reduced power consumption.
4. Awareness programmes must be conducted to all the students and staffs. Disseminate the success stories on achieved energy conservation.
5. Restrict the use of single use plastics inside the college campus
6. Create an awareness among the students not to use the plastic items inside the campus
7. To conduct an Indoor Lighting Audit and asses the illumination level at various places



Equipment's/Systems Audited:

• Electrical System & Network	• Motors & Water Pumping Systems
• Lighting, Fan & Air Conditioning System	• Boiler and Steam Distribution System
• Inverter, UPS & Battery System	• LPG & Wood Consumption
• Diesel Consumption (Vehicles + DG)	• Solid & E-Waste Handling & Management
• Usage of Chemical, Salts & Acids	• RO Plant, Water Distribution System & STP
• Coverage of mature trees	• Pollution certificates for all transport vehicles
• Rain Water Harvesting	• Survey on Bio-diversity

(Audited and Accounted from June-2016 to March-2017)

Audit Conducted and Certified by

S.R. Sivarasu

(Dr. S.R. SIVARASU)

Dr. S.R. SIVARASU, Ph.D.,
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**CERTIFICATE FOR ENERGY-ENVIRONMENT-GREEN AUDIT PROCESS**

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S. No.	Description	Parameters
1.	Present Annual Energy Consumption	3,15,685 kWh + 37,468 kg of LPG
2.	Proposed % of Energy Savings	10.0 % Electrical + 5.0 % LPG
3.	Proposed Annual Energy Savings	31,569 kWh + 1,873 kg of LPG
4.	Proposed Financial Savings	Rs. 3.8 Lakhs
5.	Initial Investment Required	Rs. 6.0 Lakhs
6.	Simple Payback Period	Nearly 1.6 Years

Analysis of Environment Audit Process and CO₂ Balance Sheet:

S. No.	CO ₂ Emission (Tons/Annum)			CO ₂ Neutralization (Tons/Annum)		
	Description	Annual Usage	CO ₂ Emission	Description	Annual Usage	CO ₂ Neutralized
1.	Diesel	2,54,123 Litres	670.9	Solar Thermal	14,470 kWh	11.9
2.	Electrical	3,15,685 kWh	258.9			
3.	LPG	37,468 kg	112.4	Mature Trees	324 Nos	7.1
4.	Wood	110 Tons	209.0			
5.	Total Emission		1,251.2	Total-Neutralized		19.0
Balance CO₂ to be Neutralized = 1,232.2 Tons/Annum						

Recommendations of the Audit Process:

1. Battery voltage of each UPS must be measured and monitored. This ensures good practices on UPS & battery maintenance.
2. Prepare and adhere a cleaning schedule for UPS (both inside and outside the cabinet) and ensure proper heat dissipation
3. Conduct some kind of awareness programmes on Energy Conservation to all the stake holders.
4. Segregation of different types of waste has to be done at source level
5. Establish an MoU with the third party to safely dispose the wastes



Equipment's/Systems Audited:

• Electrical System & Network	• Motors & Water Pumping Systems
• Lighting, Fan & Air Conditioning System	• Boiler and Steam Distribution System
• Inverter, UPS & Battery System	• LPG & Wood Consumption
• Diesel Consumption (Vehicles + DG)	• Solid & E-Waste Handling & Management
• Usage of Chemical, Salts & Acids	• RO Plant, Water Distribution System & STP
• Coverage of mature trees	• Pollution certificates for all transport vehicles
• Rain Water Harvesting	• Survey on Bio-diversity

(Audited and Accounted from June-2017 to March-2018)

Audit Conducted and Certified by

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S. No.	Description	Parameters
1.	Present Annual Energy Consumption	3,05,261 kWh + 42,466 kg of LPG
2.	Proposed % of Energy Savings	10.0 % Electrical + 5.0 % LPG
3.	Proposed Annual Energy Savings	30,526 kWh + 2,123 kg of LPG
4.	Proposed Financial Savings	Rs. 4.0 Lakhs
5.	Initial Investment Required	Rs. 6.0 Lakhs
6.	Simple Payback Period	Nearly 1.5 Years

Analysis of Environment Audit Process and CO₂ Balance Sheet:

PS. No.	CO ₂ Emission (Tons/Annum)			CO ₂ Neutralization (Tons/Annum)		
	Description	Annual Usage	CO ₂ Emission	Description	Annual Usage	CO ₂ Neutralized
1.	Diesel	2,42,657 Litres	640.6	Solar Thermal	14,470 kWh	11.9
2.	Electrical	3,05,261 kWh	250.3			
3.	LPG	42,466 kg	127.4			
4.	Wood	119 Tons	225.7	Mature Trees	324 Nos	7.1
5.	Total Emission		1,244.0	Total-Neutralized		19.0
Balance CO₂ to be Neutralized = 1,225.0 Tons/Annum						

Recommendations of the Audit Process:

1. Conversion of Fluorescent lamps into Energy Efficient LED saves good amount of energy
2. Measure the earth resistance at regular interval and maintain within the standard.
3. Observe the voltage drop between supply point and load end and ensure that the voltage drop must be minimum
4. Voltage drop at the load end can be improved by load end capacitors compensation
5. Energy usage and CO₂ emission must be reduced using proper conservation methods
6. Regularly test the pollution level of the college owned vehicles



Equipment's/Systems Audited:

• Electrical System & Network	• Motors & Water Pumping Systems
• Lighting, Fan & Air Conditioning System	• Boiler and Steam Distribution System
• Inverter, UPS & Battery System	• LPG & Wood Consumption
• Diesel Consumption (Vehicles + DG)	• Solid & E-Waste Handling & Management
• Usage of Chemical, Salts & Acids	• RO Plant, Water Distribution System & STP
• Coverage of mature trees	• Pollution certificates for all transport vehicles
• Rain Water Harvesting	• Survey on Bio-diversity

(Audited and Accounted from June-2018 to March-2019)

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S. No.	Description	Parameters
1.	Present Annual Energy Consumption	3,05,376 kWh + 34,901 kg of LPG
2.	Proposed % of Energy Savings	10.0 % Electrical + 5.0 % LPG
3.	Proposed Annual Energy Savings	30,538 kWh + 1,745 kg of LPG
4.	Proposed Financial Savings	Rs. 3.8 Lakhs
5.	Initial Investment Required	Rs. 5.0 Lakhs
6.	Simple Payback Period	Nearly 1.3 Years

Analysis of Environment Audit Process and CO₂ Balance Sheet:

S. No.	CO ₂ Emission (Tons/Annum)			CO ₂ Neutralization (Tons/Annum)		
	Description	Annual Usage	CO ₂ Emission	Description	Annual Usage	CO ₂ Neutralized
1.	Diesel	2,23,021 Litres	588.8	Solar Thermal	14,470 kWh	11.9
2.	Electrical	3,05,376 kWh	250.4			
3.	LPG	34,901 kg	104.7			
4.	Wood	113 Tons	215.3	Mature Trees	324 Nos	7.1
5.	Total Emission		1,159.2	Total-Neutralized		19.0
Balance CO₂ to be Neutralized = 1,140.2 Tons/Annum						

Recommendations of the Audit Process:

1. Prepare a schedule to clean the air filters of AC indoor units at regular intervals
2. Observe the performance of the AC unit before and after air filter cleaning
3. Convert the common switches used for lights and fans into single controlled system
4. Compensate the electrical distribution losses by connecting load end capacitors
5. Provide training to the transport staffs to reduce the fuel consumption
6. Create a policy for chemical, acids and salts for safe storage, handling and disposal
7. Plan for scientific way of waste disposal must be adopted
8. Paste water and energy saving slogans at appropriate places



9. The food waste must be weighted and marked in a record before keeping into the digester unit. This must be checked with the amount of gas generated using suitable calculation and check with the designed output

Equipment's/Systems Audited:

• Electrical System & Network	• Motors & Water Pumping Systems
• Lighting, Fan & Air Conditioning System	• Boiler and Steam Distribution System
• Inverter, UPS & Battery System	• LPG & Wood Consumption
• Diesel Consumption (Vehicles + DG)	• Solid & E-Waste Handling & Management
• Usage of Chemical, Salts & Acids	• RO Plant, Water Distribution System & STP
• Coverage of mature trees	• Pollution certificates for all transport vehicles
• Rain Water Harvesting	• Survey on Bio-diversity

(Audited and Accounted from June-2019 to March-2020)

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(GST No. 33AAZFR8890A1ZN)

CERTIFICATE FOR ENERGY AUDIT PROCESS

This is to certify that, we have conducted a detailed ENERGY AUDIT in NANDHA ENGINEERING COLLEGE (AUTONOMOUS), Erode – Perundurai Main Road, Vaikkaalmedu, Erode – 638 052, Tamil Nadu, India on 25 MARCH 2021. The audit team has identified 11 Energy Conservation Proposals (ENCONs) and the summary of the Energy Audit Process is given below.

Description/Year	2016-17	2017-18	2018-19	2019-20	2020-21
Annual Electricity Consumption (kWh)	3,48,025	3,15,685	3,05,261	3,05,376	1,37,008
Annual LPG Consumption (kg)	39,780	37,468	42,466	34,901	13,889
Annual Wood Consumption (Tons)	131.2	110.0	118.8	113.3	41.3
Summary of Energy Conversion (ENCON) Proposals					
S. No.	Description	Parameters			
		Present	After	Savings	
1.	Annual Energy Consumption	3,05,261 kWh + 42,466 kg of LPG + 119 Tons of Wood	27,0,138 kWh + 36,971 kg of LPG + 86.1 Tons of Wood	35,123 kWh + 5,495.0 kg of LPG + 32.9 Tons of Wood	
2.	Annual Energy Cost	Rs. 56.0 Lakhs	Rs. 48.6 Lakhs	Rs. 7.4 Lakhs	
3.	Initial Investment Required	-	-	Rs. 13.0 Lakhs	
4.	Simple Payback Period	-	-	Nearly 1.8 Years	

Equipment's/Systems Audited:

• Electrical System & Network	• Motors & Water Pumping Systems
• Lighting, Fan & Air Conditioning System	• Boiler and Steam Distribution System
• Inverter, UPS & Battery System	• LPG & Wood Consumption

(Note: The Energy Conservation Proposals are presented in the Audit Report)

Thank You

Audit Conducted and Verified by,

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**CERTIFICATE FOR ENVIRONMENTAL AUDIT PROCESS**

This is to certify that, we have conducted an **ENVIRONMENTAL AUDIT** in **NANDHA ENGINEERING COLLEGE (AUTONOMOUS)**, Erode – Perundurai Main Road, Vaikkaalmedu, Erode – 638 052, Tamil Nadu, INDIA on 25 MARCH 2021. This audit process highlights the present CO₂ emission and methods adopted to neutralize the same in the college campus.

Environmental System: CO₂ Balance Sheet (2016-17)

S. No.	Energy Consumption & CO ₂ Emission			CO ₂ Neutralization		
	Description	Annual Usage	CO ₂ Emission (Tons/Annum)	Description	Annual Usage	CO ₂ Neutralized (Tons/Annum)
1.	Diesel	2,02,278 Litres	534.0	Solar Thermal System	14,470 kWh	11.9
2.	Electrical Energy	3,48,025 kWh	285.4			
3.	LPG Consumption	39,780 kg	119.3	Mature Trees	324 Nos	7.1
4.	Wood	131 Tons	249.3			
5.	Total Emission		1,188.0	Total-Neutralized		19.0
Balance CO₂ to be Neutralized = 1,168.0 Tons/Annum						

(Note: Amount of energy utilized from the solar thermal (2,000 LPD) is being converted into its electrical equivalent. The diesel consumption includes both for DG and Transport application)

Environmental System: CO₂ Balance Sheet (2017-18)

S. No.	Energy Consumption & CO ₂ Emission			CO ₂ Neutralization		
	Description	Annual Usage	CO ₂ Emission (Tons/Annum)	Description	Annual Usage	CO ₂ Neutralized (Tons/Annum)
1.	Diesel	2,54,123 Litres	670.9	Solar Thermal System	14,470 kWh	11.9
2.	Electrical Energy	3,15,685 kWh	258.9			
3.	LPG Consumption	37,468 kg	112.4	Mature Trees	324 Nos	7.1
4.	Wood	110 Tons	209.0			
5.	Total Emission		1,251.2	Total-Neutralized		19.0
Balance CO₂ to be Neutralized = 1,232.2 Tons/Annum						

**Environmental System: CO₂ Balance Sheet (2018-19)**

S. No.	Energy Consumption & CO ₂ Emission			CO ₂ Neutralization		
	Description	Annual Usage	CO ₂ Emission (Tons/Annum)	Description	Annual Usage	CO ₂ Neutralized (Tons/Annum)
1.	Diesel	2,42,657 Litres	640.6	Solar Thermal System	14,470 kWh	11.9
2.	Electrical Energy	3,05,261 kWh	250.3			
3.	LPG Consumption	42,466 kg	127.4	Mature Trees	324 Nos	7.1
4.	Wood	119 Tons	225.7			
5.	Total Emission		1,244.0	Total-Neutralized		19.0
Balance CO₂ to be Neutralized = 1,225.0 Tons/Annum						

Environmental System: CO₂ Balance Sheet (2019-20)

S. No.	Energy Consumption & CO ₂ Emission			CO ₂ Neutralization		
	Description	Annual Usage	CO ₂ Emission (Tons/Annum)	Description	Annual Usage	CO ₂ Neutralized (Tons/Annum)
1.	Diesel	2,23,021 Litres	588.8	Solar Thermal System	14,470 kWh	11.9
2.	Electrical Energy	3,05,376 kWh	250.4			
3.	LPG Consumption	34,901 kg	104.7	Mature Trees	324 Nos	7.1
4.	Wood	113 Tons	215.3			
5.	Total Emission		1,159.2	Total-Neutralized		19.0
Balance CO₂ to be Neutralized = 1,140.2 Tons/Annum						



Environmental System: CO₂ Balance Sheet (2020-21)

S. No.	Energy Consumption & CO ₂ Emission			CO ₂ Neutralization		
	Description	Annual Usage	CO ₂ Emission (Tons/Annum)	Description	Annual Usage	CO ₂ Neutralized (Tons/Annum)
1.	Diesel	45,703 Litres	120.7	Solar PV System	47,211 kWh	38.7
2.	Electrical Energy	1,37,008 kWh	112.3	Solar Thermal System	14,470 kWh	11.9
3.	LPG Consumption	13,889 kg	41.7	Mature Trees	324 Nos	7.1
4.	Wood	41 Tons	78.5			
5.	Total Emission		353.1	Total-Neutralized		57.7
Balance CO₂ to be Neutralized = 295.4 Tons/Annum						

(Note: During the year 2019-20 & 20-21; due to the COVID lockdown, the values of all the energy quantities are less in nature)

System Audited	Systems Inspected
• Electricity Consumption	• Solid & E-Waste Handling & Management
• Diesel Consumption (Vehicles + DG)	• Usage of Chemical, Salts & Acids
• LPG & Wood Consumption	• RO Plant, Water Distribution System & STP

(Note: The Detailed Analysis of the Environment Study are presented in the Audit Report)

Thank You

Audit Conducted and Verified by,

(Dr. S.R. SIVARASU)

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CERTIFICATE FOR GREEN AUDIT PROCESS

This is to certify that, we have conducted a **GREEN AUDIT** in **NANDHA ENGINEERING COLLEGE (AUTONOMOUS)**, Erode – Perundurai Main Road, Vaikkaalmedu, Erode – 638 052, Tamil Nadu, INDIA on **25 MARCH 2021**. This audit process investigates the following activities:

- I) Coverage of mature trees (nearly 324 trees available in the college campus).
- II) Availability of Indoor plants and Improvement of Air Quality
- III) Pollution certificates for all transport vehicles
- IV) Innovative ways to harvest rain water (Both from buildings and in road run-off)
- V) Initiatives taken to promote Green coverage inside the college campus
- VI) Medical plant gardening inside the campus for future planning
- VII) Analysis of Rooftop Solar PV Plant (50 kW Grid Interactive Model)
- VIII) Assessment of Solar Thermal Hot Water system in Boy's hostel
- IX) Identification of expansion of green coverage for planting more trees
- X) Survey on bio-diversity and plan for improvement of Birds, Reptile and Amphibian
- XI) Possibilities to implement various Renewable Energy Systems for regular activities (Like Solar hot water system, bio-manure generation, waste to electricity, waste to wealth etc.,)

(Note: The detailed Campus Greenery Coverage & initiatives are presented in the Audit Report)

Thank You

Audit Conducted and Verified by,

S.R. Sivarasu

(Dr. S.R. SIVARASU)

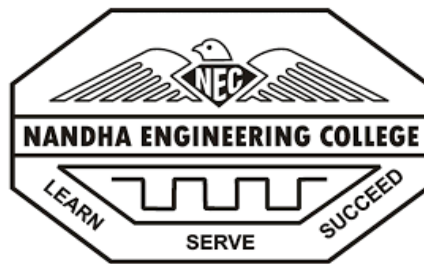
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ENERGY, ENVIRONMENT & GREEN AUDIT – FOLLOW UP AUDIT

DETAILS OF THE CLIENT

NANDHA ENGINEERING COLLEGE (AUTONOMOUS)

Erode – Perundurai Main Road, Vaikkaalmedu,
Erode – 638 052, Tamil Nadu, India



DATE OF AUDIT

02 MARCH 2023

(Audited and Accounted from March 2022 to February 2023)

AUDIT CONDUCTED AND SUBMITTED BY

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ENERGY, ENVIRONMENT & GREEN AUDIT - FOLLOW UP AUDIT

Details of the Client

**NANDHA ENGINEERING COLLEGE
(AUTONOMOUS)**

**Erode - Perundurai Main Road, Vaikkaalmedu,
Erode - 638 052, Tamil Nadu, India.**

1. ACKNOWLEDGEMENT

ACKNOWLEDGEMENT

RAM KALAM CENTRE FOR ENERGY CONSULTANCY AND TRAINING Coimbatore - 641 062 is thankful to the Management, Faculty and Technical team members of M/s. **NANDHA ENGINEERING COLLEGE (AUTONOMOUS)**, Erode - Perundurai Main Road, Vaikkaalmedu, Erode - 638 052, Tamil Nadu, India for providing an opportunity to conduct the **follow-up Energy, Environment and Green Audit for college promises.**

It is our great pleasure which must be recorded here that the management of M/s. **NANDHA ENGINEERING COLLEGE (AUTONOMOUS)** all possible support and assistance resulting in expeditious completion of the audit process. The audit team appreciates the cooperation and guidance extended during course of site visit and measurements. We are also thankful to the all those who gave us the necessary inputs and information to carry out this very vital exercise of green audit.

Finally, we offer our sincere thanks to all the members in the engineering division/ technical/non-technical and office members who were directly and indirectly involved with us during collection of data and conducting field measurements

<u>Audit Team Members</u>	
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ENERGY, ENVIRONMENT & GREEN AUDIT – FOLLOW UP AUDIT

Details of the Client

**NANDHA ENGINEERING COLLEGE
(AUTONOMOUS)**

**Erode – Perundurai Main Road, Vaikkaalmedu,
Erode – 638 052, Tamil Nadu, India.**

2. INTRODUCTION TO ENERGY-ENVIRONMENT-GREEN AUDIT PROCESS

2.1: Preface about the Institution:

- **Sri Nandha Educational Trust** was established in 1992. The trust functions with Thiru. V. Shanmugan as Chairman cum Managing Trustee and his family members as trustees. Nandha Educational Institutions has successfully crossed many milestones and presently functioning with 19 Institutions with 16,200 students.
- **Nandha Engineering College** was established in 2001 with 3 branches. Presently it is functioning with 10 UG branches and 6 PG branches with 720 and 162 student's intake respectively.
- **Nandha Engineering College** was conferred **Autonomous** in the year **2013**. The college is having NBA accreditation for programmes like, Computer Science Engineering, Electronics and Communication Engineering and Information Technology. It has been approved as Research Centres for the departments such as CSE, Mechanical and ECE by Anna University.
- The College has received 1.02 Crores as Grants from various funding agencies such as AICTE, TNSCST, ISRO, CSIR, NHRC, etc. MHRD Institute Innovation Council has rated the Institution with 5 Star Ranking based on the distinct activities of the college.

2.2: Vision:

- To be a world class Engineering and Management Institution in leading technological and socio-economic development of the country by enhancing the global competitiveness of technical manpower and by ensuring high quality technical education through dissemination of knowledge, insights and intellectual contributions.

2.3: Mission:

- To provide value-based technical education and mould the character of younger generation.

2.4: Quality Policy:

- We, at **NANDHA ENGINEERING COLLEGE**, as a dedicated team are committed to constantly, and consistently work for the students' continual improvement in terms of quality in education, updated technical knowledge, personality development and career advancement to meet the challenges in the world.

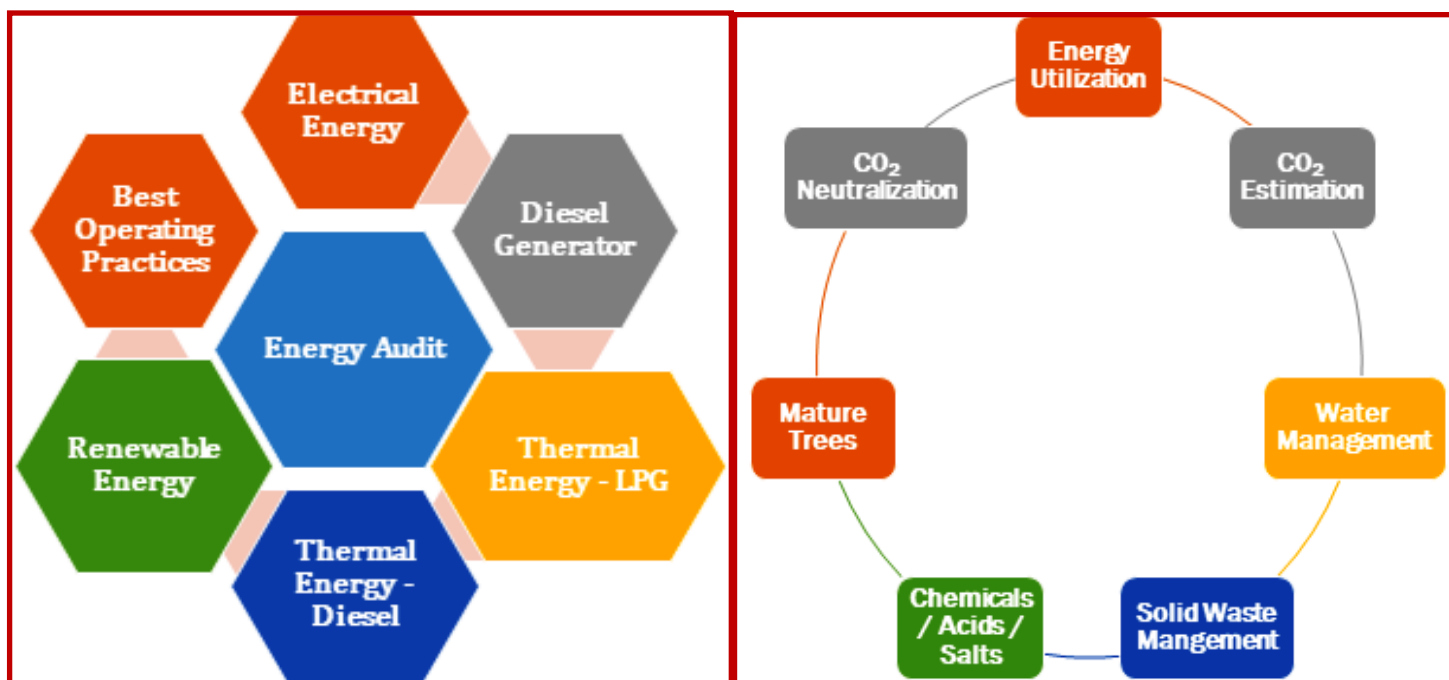
2.5: Major Activities in the Institution:



2.6: Scope of the Audit Process:

- **Energy Audit:** Conduct a detailed energy audit in the college campus with a main focus to identify judicious usage of electrical and thermal energy (where, when, why and how energy is being utilized).
- To ascertain the best practices to be followed in energy conservation, energy management, recommended safety measures and continuous energy monitoring system.
- **Environmental Audit:** Identification of history of activities, present environmental practices followed, monitoring records and known sources of environmental issues inside the college.
- Adoption of natural resources as input (such as energy and water), processing and utilization and generation of wastes (including hazardous and toxic),
- Handling and storage of all types of wastes (Solid, liquid and grous), transportation of waste from source to yard, reuse and recycling possibilities, storage mechanism and effective disposal.
- Measurement of effectives of pollution control (air, water and soil pollution), maintenance logs, emission test reports and routine analytical reports.
- Providing constant awareness to all stakeholders on Environment impacts, risk analysis and Ecology.

2.7: Coverage in Energy, Environment & Green Audit Process:



2.8: Date of Audit:



**ENERGY, ENVIRONMENT &
GREEN AUDIT – FOLLOW UP AUDIT**

Details of the Client

**NANDHA ENGINEERING COLLEGE
(AUTONOMOUS)**

**Erode – Perundurai Main Road, Vaikkaalmedu,
Erode – 638052, Tamil Nadu, India.**

**3. ESTIMATION
OF
CO₂ EMISSION & NEUTRALIZATION
(CO₂ Balance Sheet)**

3.1: Assessment of Annual Energy Usage:

Table-1 shows the types of energy carriers used for their regular operation in the college campus along with application area and their source.

Table-1: Energy Carriers, Application area and their sources used for College Operation

S. No	Type of Energy Carrier	Application Area	Source of Procurement
1.	Electricity (LT)	Powering to all electrical / electronic / HVAC equipment's	From TANGEDCO
2.	Solar PV System (50 kW)		Roof top on IT & IM Blocks
3.	Diesel & Petrol	For vehicles and DG	From authorised distributor
4.	Liquefied Petroleum Gas (LPG)	Cooking	

Table-2: Analysis of Annual Energy Consumption of all types of Fuels

S. No.	Month	Electricity Consumption, Generation (kWh)			LPG Consumption (kg)	Diesel Consumption ² (L)	Wood Consumption (kg)
		EB ¹	Solar PV	DG			
1.	Mar-22	88,826	1,349	880	2,295	8,939	19.7
2.	Apr-22	90,069	687	980	2,040	6,870	11.7
3.	May-22	30,747	861	897	2,550	8,934	4.7
4.	Jun-22	31,343	744	914	2,465	10,071	8.9
5.	Jul-22	31,852	993	940	2,720	10,145	15.9
6.	Aug-22	32,286	504	910	2,295	11,259	8.3
7.	Sep-22	32,936	729	840	2,550	13,716	4.1
8.	Oct-22	34,086	718	907	2,295	11,927	10.1
9.	Now-22	35,629	569	970	2,720	15,380	9.8
10.	Dec-22	37,111	1,361	990	2,550	15,092	17.4
11.	Jan-23	37,999	562	1,000	2,210	12,460	14.0
12.	Feb-23	39,281	734	990	2,601	13,530	4.0
Total		5,22,163	9,810	11,218	29,291	1,38,323	128.0
Average		43,514	818	935	2,441	11,527	11.0

1 Cumulative energy consumption of 3 LT services

2 Cumulative diesel consumption for DG + Transport

➔ **The average cost of the Electricity is Rs. 13.40 /kwh**

➔ **The average cost of LPG is Rs.95.10/kg**

3.2: Environmental System: CO₂ Balance Sheet (March-2022 to February-23):

Table-3: CO₂ Balance Sheet Indicating its Emission and Neutralization

S. No.	Energy Consumption & CO ₂ Emission (Tons/Annum)			CO ₂ Neutralization (Tons/Annum)		
	Description	Energy Quantity	CO ₂ Emission	Description	Energy Quantity	CO ₂ Neutralized
1.	Electricity	5,22,163 kWh	428.2	Solar PV	9,076 kWh	7.4
2.	Diesel	1,38,323 L	113.4	DG Generation	11,218 L	9.2
3.	Wood	128 Ton	243.9	Mature Tree	324	7.1
4.	LPG	29,291 kg	87.9			
5.	Cumulative Emission		873.4	Cumulative Neutralized		16.6
Net amount of CO₂ to be neutralized is 856.7 Tons/Annum						

3.3: Calculation Table:

For Electricity = $\left[\text{kWh} \times \frac{0.82 \text{ kg of CO}_2 \text{ emission}}{\text{kWh}} \right]$
For Diesel = $\left[\text{Diesel Consumption (Litre)} \times \frac{2.64 \text{ kg of CO}_2 \text{ emission}}{\text{Litre of Fuel Consumption}} \right]$
For LPG = $\left[\text{LPG Consumption (kg)} \times \frac{3.0 \text{ kg of CO}_2 \text{ emission}}{\text{kg of LPG Consumption}} \right]$
A mature tree is able to absorb nearly CO ₂ at a rate of 48 lbs./year (nearly 21.8 kg); hence total CO ₂ to be neutralized is $\frac{(21.8 \times 324)}{1,000} = 7.1 \frac{\text{Tons}}{\text{Annum}}$

5.5: References:

¹ <https://ecoscore.be/en/info/ecoscore/co2>

³ <http://www.tenmilliontrees.org/trees/#:~:text=A%20mature%20tree%20absorbs%20carbon,t he%20average%20car's%20annual%20mileage>



CO₂ Emission:
873.4 Tons/Annum



CO₂ Reduction
16.6 Tons/Annum



CO₂ to be Neutralized
856.7 Tons/Annum

**ENERGY, ENVIRONMENT &
GREEN AUDIT – FOLLOW UP AUDIT**

Details of the Client

**NANDHA ENGINEERING COLLEGE
(AUTONOMOUS)**

**Erode – Perundurai Main Road, Vaikkaalmedu,
Erode – 638 052, Tamil Nadu, India.**

**4. ACTIVITIES COMPLETED
&
RECOMMENDATIONS**

4.1: Activities Completed:

The audit team appreciates that the management of **NANDHA ENGINEERING COLLEGE (AUTONOMOUS)** has taken several measures to save energy and to protect the environment inside the college campus. The followings are the activities completed accounted for the last one year.

DATE	ACTIVITY	VENUE	STRENGTH
11.08.2022	Drive Against Drugs Awareness Programme	College Campus	700
15.08.2022	Independence Day Celebration	College Campus	100
30.09.2022	Health Checkup and Blood Donation Camp	College Campus	63
01.10.2022	Rally Walk & Awareness	Erode	49
15.10.2022	Youth Awakening Day	College Campus	47
29.10.2022	Clean India 2.0	Perundurai	72
31.10.2022	National Unity Day	College Campus	262
09.11.2022	Counting of Hundi Money	Chennimalai	60
01.12.2022	International Day of Persons with Disabilities	Erode	30
07.01.2023	Cleaning Programme	Government Higher Secondary School,	68
22.01.2023	Blood Donation	Texvalley	8
25.01.2023	National Voters Day	College Campus	310
04.02.2023	Cleaning Programme	Government Higher Secondary School, Thudupathi	66
04.03.2023	Cleaning Programme	Chennimalai	87
09.03.2023	Awareness Programme	College Campus	718
15.03.2023	World Consumers Rights Day	Vellalar College of Education, Erode	37
29.04.2023	Cleaning and Awareness Programme	Government Hospital, Perundurai	86
20.05.2023	Cleaning Programme	Chennimalai	62

A. CLEAN INDIA 2.0 - 29.10.2022:

- ✓ The NSS Volunteers of Nandha Engineering College conducted a **Clean India 2.0** programme at Perundurai on **October 29, 2022**. During this programme, the student volunteers cleaned the various areas of Perundurai. The students have removed the plastic and trash from the roadside. The students have covered the areas of Perundurai, Thendral Nagar, and Thoppu Palayam. The students have insisted that the public keep their premises clean and avoid using plastic. The students have insisted

that the public use trash cans for their trash. 72 student volunteers participated in this cleaning programme.

- ✓ Thiru.OCV. Rajendran, Chairman of Perundurai town Panchayat, has appreciated the volunteers for their work and encouraged them to do more social activities.



B. CLEANING PROGRAMME – 07.01.2023:

- The NSS Volunteers of Nandha Engineering College conducted a cleaning programme at Government Higher Secondary School, Seenapuram, on **January 7, 2023**. During this programme, the student volunteers cleaned the premises of the school. The students have removed the plastic and trash from the premises of the school. The students have insisted that the school students keep the premises clean and avoid using plastic. The students have insisted the school students keep their trash in dustbins. **68 student volunteers**, along with two faculty members, participated in this cleaning programme.



C. CLEANING PROGRAMME – 04.02.2023:

- The NSS Volunteers of Nandha Engineering College conducted a cleaning programme at Government Higher Secondary School, Thuduppathi, on **February 4, 2023**. During this programme, the student volunteers cleaned the premises of the school. The students have

removed the plastic and trash from the premises of the school. The students have insisted that the school students keep the premises clean and avoid using plastic. The students have insisted the school students keep their trash in dustbins. **66 student volunteers**, along with two faculty members, participated in this cleaning programme.



D. CLEANING PROGRAMME – 04.03.2023:

- ✓ The NSS Volunteers of Nandha Engineering College conducted a cleaning programme at Subramanya Swamy Temple, Chennimalai, on 04.03.2023. During this programme, the student volunteers cleaned the steps and premises of the temple. The students have removed the plastic and trash from the steps and premises of the temple. The students have insisted the devotees keep the temple premises clean and avoid using plastic. The students have insisted the devotees keep their trash in dustbins. 87 student volunteers participated in this cleaning programme.



E. CLEANING ACTIVITY-29.04.2023:

- ❖ The NSS Volunteers of Nandha Engineering College conducted a cleaning programme at Government Hospital, Perundurai, on 29.04.2023. During this programme, the student volunteers cleaned the premises of the government hospital. The students have removed the plastic and trash from the hospital's premises. The students have insisted that patients and visitors keep the hospital premises clean and avoid using

plastic. The students have insisted that patients and visitors use trash cans for their trash. 86 student volunteers participated in this cleaning programme.

- ❖ Dr. Shanthi, Chief Medical Officer, Government Hospital, Perundurai, has appreciated the volunteers for their work and encouraged them to do more social activities, and she shared some tips for volunteers to have good health and wealth.



F. CLEANING PROGRAMME-20.05.2023:

- The NSS Volunteers of Nandha Engineering College conducted a cleaning programme at Subramanya Swamy Temple, Chennai, on 20.05.2023. During this programme, the student volunteers cleaned the steps and premises of the temple. The students have removed the plastic and trash from the steps and premises of the temple. The students have insisted the devotees keep the temple premises clean and avoid using plastic. The students have insisted the devotees keep their trash in dustbins. 62 student volunteers participated in this cleaning programme.



4.2: RECOMMENDATIONS:

- Prepare a schedule to clean the air filters of AC indoor units at regular intervals
- Measure the earth resistance at regular interval and maintain within the standard.
- Voltage drop at the load end can be improved by load end capacitors compensation
- Battery voltage of each UPS must be measured and monitored.
- Prepare and adhere a cleaning schedule for UPS
- Conduct awareness programmes on Energy Conservation to all the stake holders.
- Foot valve of all the submersible and open well pipes must be cleaned at regular intervals and this ensure i) free flow of water and ii) reduced power consumption.

Audit Conducted and Verified by,



(Dr. S.R. SIVARASU)

Dr. S.R. SIVARASU, Ph.D.,
BEE Certified Energy Auditor (EA-27299)
Lead Auditor - ISO 14001: EMS
IGBC - AP, GRIHA - CP
Mobile: 80567 19372, 99420 29372
E-Mail: ramkalamcct@gmail.com

COMPLETION OF THE REPORT

This report is prepared as a part of the **Follow-Up Energy, Environment and Green Audit** process conducted at M/s. NANDHA ENGINEERING COLLEGE (AUTONOMOUS), Erode - Perundurai Main Road, Vaikkaalmedu, Erode - 638 052, Tamil Nadu, India by **RAM-KALAM CENTRE FOR ENERGY CONSULTANCY AND TRAINING**, Coimbatore-641 062, Tamilnadu, India.

**ENERGY, ENVIRONMENT &
GREEN AUDIT – FOLLOW UP AUDIT**

Details of the Client

**NANDHA ENGINEERING COLLEGE
(AUTONOMOUS)**

**Erode – Perundurai Main Road, Vaikkaalmedu,
Erode – 638 052, Tamil Nadu, India.**

ANNEXURE:
AUTHORISED CERTIFICATES OF THE AUDITOR



CERTIFICATE

The Certification Body
of TÜV SÜD South Asia Private Limited

certifies that



**M/S RAMKALAM CENTRE FOR ENERGY
CONSULTANCY & TRAINING**
No.8, VPK Garden, Velanaipatti, Coimbatore – 641 062, India

has implemented Quality Management System
in accordance with **ISO 9001:2015**
for the scope of

**Providing Energy, Environment, Green audits to industry,
Academic institutions and organizations**

The certificate is valid from **2023-11-22** until **2026-11-21**

Subject to successful completion of annual periodic audits

The present status of this certificate can be obtained through TÜV SÜD website by scanning below QR code and by entering the certificate number (without spaces) on web page. Further clarifications regarding the status & scope of this certificate may be obtained by consulting the certification body at info.in@tuv sud.com

Certificate Registration No. **99 100 23573**

Date of Initial certification: **2023-11-22**

Issue Date: **2023-11-22 Rev. 00**

Rahul Kale
Head of Certification Body
of TÜV SÜD South Asia Private Limited,
Mumbai
Member of TÜV SÜD Group



Reg No.: EA-27299



Certificate No.: 9645/19

National Productivity Council
(National Certifying Agency)
PROVISIONAL CERTIFICATE

This is to certify that **Mr./Mrs./Ms. SIVARASU SULUR RATHINAVELU**
P RATHINAVELU son / daughter of Mr. has passed the National certification Examination for Energy Auditors held in September 2018, conducted on behalf of the Bureau of Energy Efficiency, Ministry of Power, Government of India. He / She is qualified as **Certified Energy Manager** as well as **Certified Energy Auditor**.

He / She shall be entitled to practice as Energy Auditor under the Energy Conservation Act 2001, subject to the fulfillment of qualifications for Accredited Energy Auditor and issuance of certificate of Accreditation by the Bureau of Energy Efficiency under the said Act.

This certificate is valid till the Bureau of Energy Efficiency issues an official certificate.

Digitally Signed by K V R. RAJU
Mon Apr 22 16:22:42 IST 2019
Controller of Examination, NPC AIP Chennai

Place : Chennai, India
Date : 22nd April, 2019

Controller of Examination



**ISO 14001:2015 Lead Auditor
(Environmental Management Systems)
Training course**

it is hereby certified that

Dr. S. R. Sivarasu

has successfully completed the above mentioned course and examination

08th - 12th December 2017

Coimbatore, India

Certificate No. 3521 2982 02

Delegate No. 71968

for TÜV NORD CERT GmbH

Essen, 2018-01-11

Course 18125 is certified by CQI/IRCA and meets the training requirements for those seeking certification under the IRCA EMS auditor certification scheme.

TÜV NORD CERT GmbH

Langemarckstraße 20

45141 Essen

www.tuv-nord-cert.com





Confederation of Indian Industry

The Indian Green Building Council

hereby certifies that

Sivarasu S R

has successfully demonstrated knowledge on the Green Building Design & Construction, Building Standards & Codes, IGBC Resources & Processes and Green Design Strategies & their Impacts, required to be awarded the title of

IGBC Accredited Professional

K S Venkatagiri
Executive Director
CII-Godrej GBC

V Suresh
Chairman
Indian Green Building Council

Gurmit Singh Arora
Vice-Chairman
Indian Green Building Council

200239

20 June 2020



GREEN RATING FOR INTEGRATED HABITAT ASSESSMENT

GRIHA CERTIFIED PROFESSIONAL CERTIFICATE

This is to certify that

Sivarasu sr

has qualified as a **GRIHA** Certified Professional For V. 2015

Date of issue: 18th September 2020

Note : This certification is valid only for GRIHA version 2015.

Chief Executive Officer
GRIHA Council





RAM KALAM CENTRE FOR ENERGY CONSULTANCY & TRAINING

No.8, VPK Garden, Mylampatti, Coimbatore – 641 062

GSTIN: 33AAZFR8890A1ZN



ENERGY AUDIT CERTIFICATE

RAM KALAM/NEC/FEA/March/2023/01

(Audited and Accounted from March 2022 to February 2023)

This is to certify that, we have conducted a detailed ENERGY AUDIT in **NANDHA ENGINEERING COLLEGE (AUTONOMOUS), Erode – Perundurai Main Road, Vaikkaalmedu, Erode – 638 052, Tamil Nadu, India on 02 March 2023. The college is now practicing various energy conservation measures, implemented energy efficient lighting system, following Best operating Practices (BoP) and utilizing all kind of energy in a Judicious manner.**

Audit conducted and verified by

S.R. Sivarasu

Dr. S.R. SIVARASU

BEE Certified Energy Auditor (EA-27299)

Lead Auditor – ISO 14001: EMS; IGBC AP, GRIHA CP

CII Certified Professional in SWM

ISO-14064: Implementor & Auditor - Carbon Footprint Management



RAM KALAM CENTRE FOR ENERGY CONSULTANCY & TRAINING

No.8, VPK Garden, Mylapatti, Coimbatore – 641 062

GSTIN: 33AAZFR8890A1ZN



ENVIRONMENT AUDIT CERTIFICATE

RAM KALAM/NEC/FENA/March/2023/02

(Audited and Accounted from March 2022 to February 2023)

This is to certify that, we have conducted a detailed ENVIRONMENT AUDIT in **NANDHA ENGINEERING COLLEGE (AUTONOMOUS), Erode – Perundurai Main Road, Vaikkaalmedu, Erode – 638 052, Tamil Nadu, India on 02 March 2023. The college has upholding excellent Balance of CO2 emission & reduction, providing quality water, preserving great environment system and also educating the same to all the students.**

Audit conducted and verified by

Dr. S.R. SIVARASU

BEE Certified Energy Auditor (EA-27299)

Lead Auditor – ISO 14001: EMS; IGBC AP, GRIHA CP

CII Certified Professional in SWM

ISO-14064: Implementor & Auditor - Carbon Footprint Management



RAM KALAM CENTRE FOR ENERGY CONSULTANCY & TRAINING

No.8, VPK Garden, Mylampatti, Coimbatore – 641 062

GSTIN: 33AAZFR8890A1ZN



GREEN AUDIT CERTIFICATE

RAM KALAM/NEC/FGA/March/2023/03

(Audited and Accounted from March 2022 to February 2023)

This is to certify that, we have conducted a detailed GREEN AUDIT in **NANDHA ENGINEERING COLLEGE (AUTONOMOUS), Erode – Perundurai Main Road, Vaikkaalmedu, Erode – 638 052, Tamil Nadu, India on 02 March 2023. The college has exemplary greenery, transportation system with Pollution Control Certificates, effective waste management and rich collection of Flora & Fauna.**

Audit conducted and verified by

Dr. S.R. SIVARASU

BEE Certified Energy Auditor (EA-27299)

Lead Auditor – ISO 14001: EMS; IGBC AP, GRIHA CP

CII Certified Professional in SWM

ISO-14064: Implementor & Auditor - Carbon Footprint Management