



# RAM KALAM -CENTRE FOR ENERGY CONSULTANCY & TRAINING

CHENNAI

COIMBATORE

ERODE

(Regt. Office No. 8, VPK Garden, Coimbatore-641 062,

Mobile: +91-99420 14544, 80567 19372, Email: ramkalamcect@gmail.com)

(GST No. 33AAZFR8890A1ZN)

## CERTIFICATE FOR ENERGY AUDIT PROCESS

This is to certify that, we have conducted a detailed **ENERGY AUDIT** in CARE COLLEGE OF ENGINEERING, # 27, Thayanur , Trichy - 620 009, Tamilnadu, India on 07 & 08 APRIL 2021. The audit team has identified **10 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)	4,49,030	4,49,294	4,57,270	3,84,930	1,89,660
Annual LPG Consumption (kg)	14,062	10,864	12,638	9,898	2,901
<b>Summary of Energy Conversion (ENCON) Proposals</b>					
S. No.	Description	Parameters			
		Present	After	Savings	
1.	Annual Energy Consumption	4,57,270 kWh + 12,638 kg LPG	4,03,925 kWh + 11,051 kg LPG	53,345 kWh + 1,587 kg of LPG	
2.	Annual Energy Cost	Rs. 47.8 Lakhs	Rs. 42.1 Lakhs	Rs. 5.7 Lakhs	
3.	Initial Investment Required	--	--	Rs. 14.0 Lakhs	
4.	Simple Payback Period	--	--	Nearly 2.5 Years	

### Equipment's/Systems Audited:

Electrical System	Thermal System
• All major Electrical Equipment's	• Inverter, UPS and Battery System
• Electrical Distribution System	• Diesel generators, Pumps and Motors
• Lightings, Fans & AC System	• Energy Efficiency in Application
• Roof top solar Thermal System	• LPG for cooking application

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

Thank You

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: ramkalamcect@gmail.com**

**CERTIFICATE FOR ENVIRONMENTAL AUDIT PROCESS**

This is to certify that, we have conducted an **ENVIRONMENTAL AUDIT** in CARE COLLEGE OF ENGINEERING, # 27, Thayanur , Trichy - 620 009, Tamilnadu, India on 07 & 08 APRIL 2021. This audit process highlights the present CO<sub>2</sub> emission and methods adopted to neutralize the same in the college campus.

**Environmental System: CO<sub>2</sub> Balance Sheet (2016-17)**

S. No.	Energy Consumption & CO <sub>2</sub> Emission			CO <sub>2</sub> Neutralization		
	Description	Annual Usage	CO <sub>2</sub> Emission (Tons/Annum)	Description	Annual Usage	CO <sub>2</sub> Neutralized (Tons/Annum)
1.	Electrical Energy	4,49,030 kWh	368.2	Wind	2,67,061 kWh	219.0
2.	Diesel	43,664 Litres	115.3	Mature Trees	1,097 Nos	23.9
3.	LPG	14,061 kg	42.2	Solar Thermal	7,750 kWh	6.4
4.	<b>Total Emission</b>		<b>525.7</b>	<b>Total-Neutralized</b>		<b>249.3</b>
<b>Balance CO<sub>2</sub> to be Neutralized = 276.4 Tons/Annum &amp; Per Capita CO<sub>2</sub> Consumption = 0.32 Tons/Annum <sup>1</sup></b>						

(<sup>1</sup> Total strength of students, teaching and technical staff = 871)

(Note: Quantity of energy utilized from the solar thermal (750 LPD) is converted into its electrical equivalent. The diesel consumption includes both for DG and Transport application)

**Environmental System: CO<sub>2</sub> Balance Sheet (2017-18)**

S. No.	Energy Consumption & CO <sub>2</sub> Emission			CO <sub>2</sub> Neutralization		
	Description	Annual Usage	CO <sub>2</sub> Emission (Tons/Annum)	Description	Annual Usage	CO <sub>2</sub> Neutralized (Tons/Annum)
1.	Electrical Energy	4,49,294 kWh	368.4	Wind	1,26,311 kWh	103.6
2.	Diesel	36,683 Litres	96.8	Mature Trees	1,097 Nos	23.9
3.	LPG	10,864 kg	32.6	Solar Thermal	7,750 kWh	6.4
4.	<b>Total Emission</b>		<b>497.9</b>	<b>Total-Neutralized</b>		<b>133.8</b>
<b>Balance CO<sub>2</sub> to be Neutralized = 364.0 Tons/Annum &amp; Per Capita CO<sub>2</sub> Consumption = 0.49 Tons/Annum <sup>2</sup></b>						

(<sup>2</sup> Total strength of students, teaching and technical staff = 738)





**Environmental System: CO<sub>2</sub> Balance Sheet (2018-19)**

S. No.	Energy Consumption & CO <sub>2</sub> Emission			CO <sub>2</sub> Neutralization		
	Description	Annual Usage	CO <sub>2</sub> Emission (Tons/Annum)	Description	Annual Usage	CO <sub>2</sub> Neutralized (Tons/Annum)
1.	Electrical Energy	4,57,270 kWh	375.0	Wind	1,67,051 kWh	137.0
2.	Diesel	33,943 Litres	89.6	Mature Trees	1,097 Nos	23.9
3.	LPG	12,638 kg	37.9	Solar Thermal	7,750 kWh	6.4
4.	<b>Total Emission</b>		<b>502.5</b>	<b>Total-Neutralized</b>		<b>167.3</b>
<b>Balance CO<sub>2</sub> to be Neutralized = 335.2 Tons/Annum &amp; Per Capita CO<sub>2</sub> Consumption = 0.60 Tons/Annum<sup>3</sup></b>						

**(<sup>3</sup> Total strength of students, teaching and technical staff = 559)**

**Environmental System: CO<sub>2</sub> Balance Sheet (2019-20)**

S. No.	Energy Consumption & CO <sub>2</sub> Emission			CO <sub>2</sub> Neutralization		
	Description	Annual Usage	CO <sub>2</sub> Emission (Tons/Annum)	Description	Annual Usage	CO <sub>2</sub> Neutralized (Tons/Annum)
1.	Electrical Energy	3,84,930 kWh	315.6	Wind	2,10,233 kWh	132.4
2.	Diesel	28,337 Litres	74.8	Mature Trees	1,097 Nos	23.9
3.	LPG	9,898 kg	29.7	Solar Thermal	4,650 kWh	3.8
4.	<b>Total Emission</b>		<b>420.1</b>	<b>Total-Neutralized</b>		<b>200.1</b>
<b>Balance CO<sub>2</sub> to be Neutralized = 220.0 Tons/Annum &amp; Per Capita CO<sub>2</sub> Consumption = 0.60 Tons/Annum<sup>4</sup></b>						

**(<sup>4</sup> Total strength of students, teaching and technical staff = 367)**

**(Note: Electrical equivalent of solar thermal (750 LPD) system is considered for 150 days/annum due to COVID lockdown)**

**Environmental System: CO<sub>2</sub> Balance Sheet (2020-21)**

S. No.	Energy Consumption & CO <sub>2</sub> Emission			CO <sub>2</sub> Neutralization		
	Description	Annual Usage	CO <sub>2</sub> Emission (Tons/Annum)	Description	Annual Usage	CO <sub>2</sub> Neutralized (Tons/Annum)
1.	Electrical Energy	1,73,580 kWh	142.3	Wind	1,55,274 kWh	127.3
2.	Diesel	17,816 Litres	47.0	Mature Trees	1,097 Nos	23.9
3.	LPG	2,705 kg	8.7	Solar Thermal	1,550 kWh	1.3
4.	<b>Total Emission</b>		<b>197.5</b>	<b>Total-Neutralized</b>		<b>165.7</b>
<b>Balance CO<sub>2</sub> to be Neutralized = 52.0 Tons/Annum &amp; Per Capita CO<sub>2</sub> Consumption = 0.13 Tons/Annum<sup>5</sup></b>						

(<sup>5</sup> Total strength of students, teaching and technical staff = 415)

- Electrical equivalent of solar thermal (750 LPD) system is considered for 50 days/annum due to COVID lockdown
- During the year 2019-20 & 20-21; due to the COVID lockdown, the values of all the energy quantities are less in nature)

• Electricity Consumption	• Usage of Chemical, Salts & Acids
• Diesel Consumption (Transport + DG)	• Cleaning agents
• LPG Consumption (Cooking)	• RO Plant and water distribution system
• Solid and E-Waste Handling & Management	• STP and waste water utilization

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

Thank You

Audit Conducted and Verified by,

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**CERTIFICATE FOR GREEN AUDIT PROCESS**

This is to certify that, we have conducted a **GREEN AUDIT** in CARE COLLEGE OF ENGINEERING, # 27, Thayanur , Trichy - 620 009, Tamilnadu, India on 07 & 08 APRIL 2021.

This audit process investigates the following activities;

1. Coverage of matured trees (nearly 1,097 trees available in the college campus)
2. Pollution certificates for all transport vehicles
3. Innovative ways to harvest rain water (Both from buildings and road run-off)
4. Initiatives taken to promote Green coverage inside the college campus
5. Implemented many flowers, shrubs and indoor plants
6. Analysis of waste water treatment in STP & treated water utilization
7. Assessment of existing Solar Thermal Energy System installed in both the hostels for bathing application and energy content equivalent to electricity consumption
8. Proposal for Rooftop Solar PV Plant with Grid Export Model
9. Planning for Improvement of Indoor and Ambient Air Quality
10. Possibilities to implement additional Renewable Energy Systems for regular activities  
(Like Solar hot water system for water preheating in cooking application, bio-manure generation, waste to electricity, waste to wealth etc.,)
11. Survey on bio-diversity and plan for improvement of Birds, Reptile and Amphibian

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

Thank You

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(Dr. S.R. SIVARASU)

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