Environmental Audit Report

Rajeev Gandhi Memorial College of Engineering & Technology,

NANDYAL ANDHRA PRADESH

EDUCATION FOR PEACE

(ESTD-1995)

GREEN DONE CONSULTANTS

Striving to make the globe greener

Service Request No.: GDCL/EVA/02/012023

1. ABOUT INSTITUTE

RGMCET (Rajeev Gandhi Memorial College of Engineering and Technology) is a renowned educational institution dedicated to fostering excellence in technical education. Located in Nandyal, Andhra Pradesh, India, RGMCET has emerged as a leading engineering college known for its commitment to academic excellence, innovation, and holistic development of students.

With a rich heritage dating back to its establishment in 1995, RGMCET has consistently upheld its mission of nurturing aspiring engineers and providing them with a conducive learning environment. The college offers a diverse range of undergraduate and postgraduate programs in engineering, empowering students with the knowledge and skills needed to excel in the ever-evolving global industry.

RGMCET prides itself on its state-of-the-art infrastructure and modern facilities that facilitate a comprehensive learning experience. The college boasts well-equipped laboratories, advanced research centers, spacious classrooms, and a well-stocked library that houses an extensive collection of books, journals, and digital resources. The campus also provides hostel facilities for students, ensuring a comfortable and secure environment for their academic pursuits.

The college has a distinguished faculty comprising experienced professors, industry experts, and scholars who are committed to delivering quality education and mentorship to the students. They employ innovative teaching methodologies, encourage active participation, and foster a spirit of inquiry and critical thinking. This pedagogical approach enables students to develop a strong foundation in engineering principles while nurturing their creativity and problem-solving abilities.

Beyond academics, RGMCET is dedicated to nurturing the overall development of its students. The college encourages participation in extracurricular activities, sports, cultural events, and social outreach programs. These initiatives foster leadership qualities, teamwork, and a sense of social responsibility, preparing students to become well-rounded professionals capable of making meaningful contributions to society.

RGMCET's commitment to excellence has been recognized through various accolades and affiliations. The college is affiliated with Jawaharlal Nehru Technological University, Anantapur, and is approved by the All-India Council for Technical Education (AICTE), New Delhi. It has consistently achieved impressive results in academic examinations and has a strong record of placements in reputed companies.

In conclusion, RGMCET stands as a leading institution that provides a transformative educational experience, shaping the future of engineering professionals. By fostering academic rigor, promoting research and innovation, and nurturing holistic development, RGMCET continues to inspire and empower the next generation of engineers to make a positive impact in the world.

2. INTRODUCTION

ABBREVIATIONS

Abbreviations	Full Form
GHG	Greenhouse Gases
CF	Carbon Footprint
FY	Financial Year
LPG	Liquefied Petroleum gas
Kg	Kilograms
Yr.	Year
KWh	Kilowatt hour
CNG	Compressed Natural Gas
e	equivalent
CO2	Carbon dioxide
CH4	Methane
N2O	Nitrous oxide
BEE	Bureau of Energy Efficiency

Environmental Audit Report

The Environmental Audit was undertaken at **M/s Rajeev Gandhi Memorial College of Engineering and Technology** during the month of **January 2023**.

Institute has taken care of all the environmental aspects and avoided any negative impact on the environment.

This Audit report presents the observations made at the facility and has been accessed based on multiple Environmental standards.

The environmental impacts covered by an audit may include:

- Energy
- Carbon dioxide and other emissions
- Waste
- Water
- Transport
- Biodiversity
- Procurement

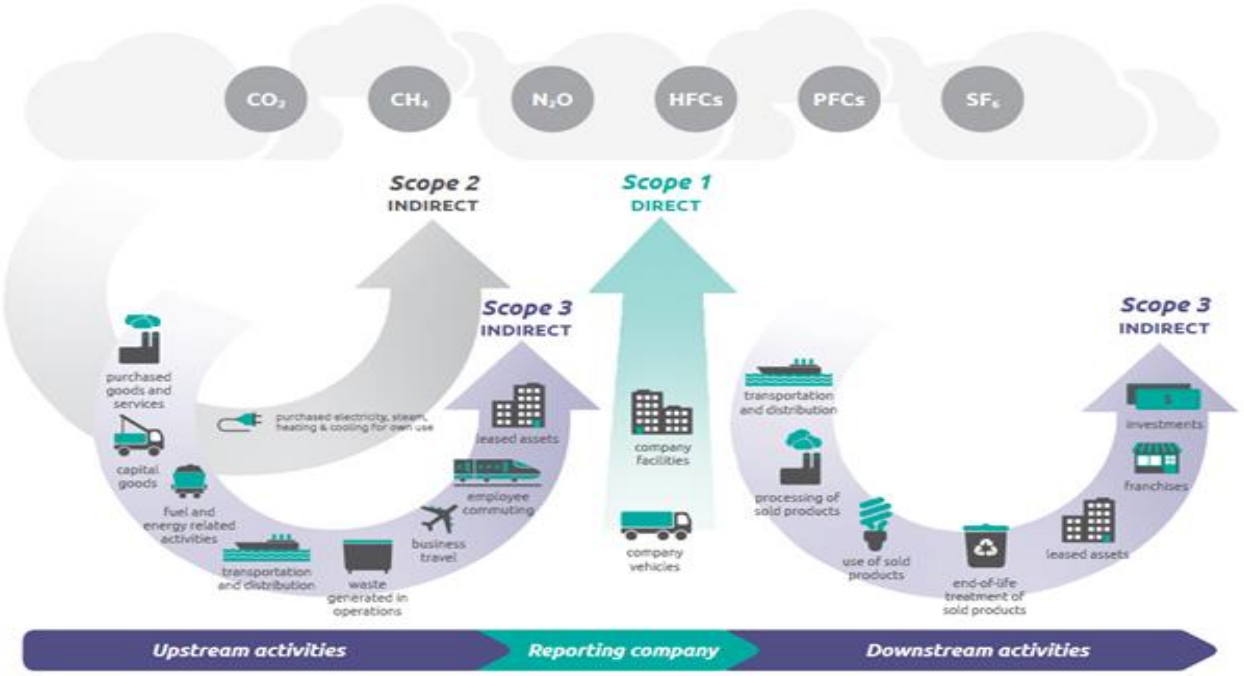
Leading Team:

- Mr Alkesh Rajdev – IGBC AP, B.E. Mechanical
- Mr Atul Joshi – Accredited Energy Auditor BEE, BE Chemical:

We wish to express our gratitude towards Chairman Dr. M. Santhiramudu, Dean RGMCET Dr. D.V. Ashok Kumar and Principal Dr. T Jayachandra Prasad for having given us the opportunity for conducting the study.

We are also thankful to the entire team of RGMCET department for extending all possible help and co-operation from their side.

3. INTRODUCTION TO GHG EMISSION



Greenhouse gas emissions are reported as metric tons of carbon dioxide equivalents (CO2e), which is the metric tonnage of CO2 emissions with the same warming potential as a metric ton of another greenhouse gas. Carbon dioxide equivalents are critical in climate reporting because they underpin every major reporting framework, and companies ready to start or expand their climate reporting efforts must be prepared to calculate their emissions in all three Scopes.

Scope 1 and 2 Emission.

When calculating Scope 1 and 2 emissions, a institute must measure all the fuel it has burned onsite (Scope 1) and the purchased electricity, steam, heating or cooling from an energy utility (Scope 2). For any institute that haven't started the journey of calculating Scope 1 and 2 emissions, the process begins with data collection and usually involves facilities, purchasing and procurement departments.

Scope 2 emissions are highly dependent on the percentage and type of renewables of the local and regional grids, which is reflected in the "emissions factor" for the grid. There are two main methods for calculating Scope 2 emissions – location and market-based. According to GHG Protocol, a location-based method reflects the average emissions intensity of grids on which energy consumption occurs. A market-based method reflects emissions from the electricity that companies have purposefully chosen. It derives emission factors from actual contracts, such as any type of contract between two parties for the sale and purchase of energy and the embedded GHG emissions. In this report we have used location-based method for calculation.

Scope 3: Other Indirect GHG Emissions

Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company but occur from sources not owned or controlled by the company. Some examples of scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of products and services.

4. ENVIORMENTAL ASSESMENT

4.1. SCOPE-1 EMISSION

Fuels- Combustion of fuels in owned or controlled stationary equipment such as boilers, furnaces, burners, turbines, heaters, incinerators, engines, flares, etc.

Data Availability:

Applicability	**Yes, Institute have DG which runs approximately 10-12 Hr/Month.**
Data Available	Yes
Accuracy	Good
Source	Diesel Purchase Records.

GHG Calculation:

Type	Fuel	Unit	Factors	Amount	kg CO2e
Liquid fuels	Diesel (average biofuel blend)	liters	2.54603	5,373.00	13,679.82

Refrigerant and others- From leakage from air-conditioning and refrigeration units or the release to the atmosphere of other gases that have a global warming potential.

Data Availability:

Applicability	**No, as most of area is naturally ventilated.**
Data Available	Not Applicable
Accuracy	Not Applicable
Source	Not Applicable

GHG Calculation:

Not Applicable.

Own or controlled vehicles- Travel in cars and on motorcycles owned or controlled by the reporting organization. This does not include vehicles owned by employees that are used for business purposes.

Data Availability:

Applicability	**Yes**, As institute have own buses.
Data Available	Data is Available and maintained.
Accuracy	Good
Source	Vehicle Records.

GHG Calculation:

Following data is for FY22-23 till January.

Vehicle	Type	Fuel	Factors	Distance (km)	kg CO2e
Vans	Average (upto 3.5t)	Diesel	0.2471	8,58,078	2,12,031.07

Total Scope-1 Emission - 225 tCO2e

	Emission source category		t CO2e
Scope 1	Direct emissions arising from owned or controlled stationary sources that use fossil fuels and/or emit fugitive emissions	Fuels	13.6
	Direct emissions from owned or controlled mobile sources	Passenger vehicles	212.03

4.2 SCOPE 2 EMISSION

ELECTRICITY AND HEATING

Market-based emissions from the generation of purchased electricity, heat, steam or cooling.

Data Availability:

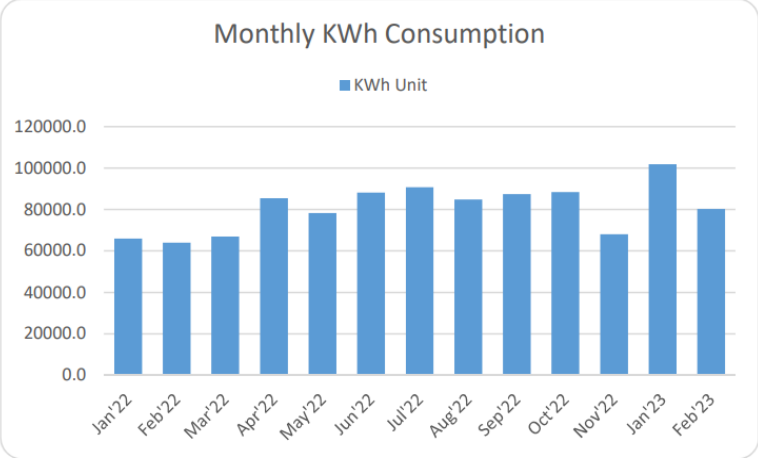
Applicability	**Yes**, Institute have Net metering with solar. No steam is used for any operation.
Data Available	Data is Available and maintained.
Accuracy	Good
Source	Electricity Bills.

GHG Calculation:

Following data is for Jan-22 to Feb-23

Hence GHG Emission under scope-2 is as follows.

Activity	Country	Unit	Factors	Amount	kg CO2e
Electricity	India	kWh	0.6727	10,50,342.00	7,06,545.97



Total Scope 2 Emission is 706 tons of CO2e per year.

	Emission source category		t CO2e
Scope 2	Location-based emissions from the generation of purchased electricity, heat, steam or cooling	Electricity	706

4.3 PARTIAL SCOPE 3 EMISSION

TRANSMISSION AND DISTRIBUTION

Emissions associated with grid losses (the energy loss that occurs in getting the electricity from the power plant to the organizations that purchase it).

Data Availability:

Applicability	**Yes**, Institute uses grid energy and hence it is applicable.
Data Available	Data is Available and maintained.
Accuracy	Good
Source	Electricity Bills.

GHG Calculation:

Activity	Unit	Factors	Amount	kg CO2e
T&D- electricity	kWh	0.02005	10,50,342.00	21,059.36
Distribution - district heat & steam	kWh	0.00908	Nil	Nil

Water Supply

Water delivered through the mains supply network.

Data Availability:

Applicability	**Yes**, Institute uses borewell water.
Data Available	No data available
Accuracy	Not Applicable
Source	Not Applicable

GHG Calculation:

Not Possible

Waste Disposal

All waste disposed in the reporting year.

Data Availability:

Applicability	**Yes.**

Data Available	Data is not available.
Accuracy	Not Applicable.
Source	Not Applicable.

GHG Calculation:

Not Possible.

BUSINESS TRAVEL: LAND AND SEA

Travel for business purposes in assets not owned or directly operated by a business. This includes mileage for business purposes in, for example, cars owned by employees, public transport and hire cars.

Data Availability:

Applicability	Yes, few travels are done for various conferences
Data Available	Not Available
Accuracy	Not Applicable
Source	Not Applicable

GHG Calculation:

Not Possible.

FOOD CONSUMPTION

Food provided by the organization to be consumed by the employees (e.g. canteens).

Data Availability:

Applicability	**Yes.** Institute have canteen for staff and students.
Data Available	Data is available.
Accuracy	Low
Source	Institute have provided data.

GHG Calculation:

Vehicle	Unit	Factors	Amount	kg CO2e

1 standard breakfast	breakfast	0.84	350	294.00
1 average meal	meal	4.70	350	1,645.00

Total Scope 3 Emission is 686 tons of CO2e per year.

4.2 EMISSION OFFSET

OFFSET BY TREES PLANTATION

Tree planting is an important element in the solution to tackle climate change - trees absorb carbon dioxide and are vital carbon sinks.

A large tree inhales around 20.3 kgs of CO2 in a year and exhales enough oxygen for a family of four for a year.

As per the World Bank-2014 data, the per capita CO2 emissions in India were around 1.7 tons per annum, expected to rise to 2-2.25 tons by 2020 and 3-3.5 tons by 2030 (source-Economic Survey 2009-10). Based on that, an average Indian needs to plant 340 trees in his/her lifetime to be carbon neutral; a study says that the rich have a more carbon-intensive lifestyle with the urban emission levels being 15 times as high as those of the rural poor.

***Note:**

- The average lifespan of a person assumed: 80 years
- The average lifespan of a tree assumed: 40 years
- Average carbon absorption by a tree assumed: 20 kg/ year

List of Plants - RGMCET

S.No	Common name	Count
1.	Senegal date palm	2
2.	Orchid tree	2
3.	Indian rose wood	1
4.	Yucca	50
5.	Tropical almond	200
6.	Pongame oiltree	10
7.	Buddha bamboo	5
8.	Night jasmine	40
9.	Neem Tree	50
10.	Lemon balm	10
11.	Indian laurel	150
12.	Bonplands croton	20
13.	Gaint milkweed	20
14.	Yellow flame	5
15.	Hairy fig	8

S.No	Common name	Count
16.	Henna	10
17.	Guava	10
18.	Tamarind	10
19.	Tulsi	20
20.	Amla	20
21.	Variegated croton	150
22.	Bankok teak	200
23.	Areca palm-green	200
24.	Areca palm-red	200
25.	Night jasmine	20
26.	Coconut palm	150
27.	Mango	50
28.	Bougainvillea	50
29.	Climbling aloe	20
30.	Big leaf mint	10
31.	Jack fruit	4
32.	Curry leaf tree	10
33.	Hawaiian hibiscus	60
34.	Wild date palm	20
35.	Jambolan	50
36.	Drum stick	10
37.	Pomegranate	50
38.	Almond	200
39.	Amla	20
40.	Lemon	10
41.	Medipandu	8
42.	Ashoka	50
43.	Teku	200
44.	Guava	10
45.	Kanakambaram	20
46.	Lily turf-black	100
47.	Garden croton	150
48.	Black panda	100
49.	Green panda	100
50.	Fellow form-green	200
51.	Fellow form-red	50
52.	Rudra Ganneru	50
53.	Royal Form	50
54.	Arce form	50

S.No	Common name	Count
55.	Temple tree	400
56.	Tekoma	100
57.	Kanuga	100
58.	Red Sandal	300
59.	Dubai Plant	100
60.	Nooruvaralu	50
61.	Ecsora	50
62.	Radhamanoharam	20
63.	Thuja	100
64.	Green Ribbon	200
65.	Black Ribbon	50
66.	Lilly	100
67.	Cycas	20
68.	Wood apple	10
69.	Nandivardhanam	30
70.	Ganneru Tree	10
71.	Mahagani-Australia	10
72.	Mahagani-Karnataka	10
73.	Christmas Tree	4
74.	Docoma	20
75.	Panchamukhi Rudraksha	2
76.	Eucalyptus	5
77.	Duranta	200

Total Number of trees are 5156. CO2 Offset of Emission by trees is 103 tons of CO2e per year.

4.4 TOTAL EMISSION

	Emission source category		t CO2e
Scope 1	Direct emissions arising from owned or controlled stationary sources that use fossil fuels and/or emit fugitive emissions	Fuels	13.68
	Direct emissions from owned or controlled mobile sources	Bus and Car	212.03
Scope 2	Location-based emissions from the generation of purchased electricity, heat, steam or cooling	Electricity	706.55
		Heat and steam	-
		Electricity for Evs	-
		District cooling	-
Scope 3	Fuel- and energy-related activities	All other fuel- and energy related activities	115.00
		Transmission and distribution losses	21.06
	Waste generated in operations	Waste water	-
		Waste	-
	Purchased goods	Water supplied	-
		Material use	-
	Business travel	All transportation by air	0.13
		Emissions arising from hotel accommodation associated with business travel	-
		All transportation by sea	-
		All transportation by land, public transport, rented/leased vehicle and taxi	-
	Upstream transportation and distribution	Freighting goods	-

	Employees commuting	-
	Food	550.04
	Home office	-
		1,618.48

5. CONCLUSION

Institute have already taken many steps inline with reduction of GHG emission. Same has been reflecting in detail calculations as above. Few of the important initiatives are as below.

- Institute have already replaced 80% lights with LED and planning to install smart lights in future.
- EV is used for inside the campus travel.
- Almost 48% occupants travel by Institute shuttle service and 32% travel by public transport.
- Equipment's purchased having at least 3-star rating. Energy efficiency taken care in all the recent purchase.
- 60% of the campus have fully grown trees which reduces CO2.
- Institute have installed solar to cater part load.
- Institute buildings are designed to provide comfort with less energy consumption.

However, Institute shall improve following aspects to reduce GHG emission further.

- Implement measures suggested in energy audits.
- Organic waste needs to recycle inside the campus to prepare manure. Same is getting use in landscape.
- Segregate all the waste like, Paper, Metal, e waste, Plastic and Waste and send it for recycle.
- Transportation- Much can be done to minimize transportation impacts through fleet conversions, commuter transportation and parking alternatives, and travel offsets, including air travel for faculty and staff.
- Food services: purchase and promotion of local and low carbon footprint foods and food waste reduction.
- Procurement: low emissions purchasing, green purchasing policies, and bulk purchasing through consortia.
- Education and research: eco-literacy for all students, greening the existing curricula and strengthening environmental studies programs, and fostering clean energy research and innovation.
- Investment: allocation of institution investments, especially endowment assets, toward green market sectors.
- Communication: promotion of energy conservation awareness and outreach programs.

THANK YOU