



Certificate No: 22EEGQ75

CERTIFICATE

This is to certify that

**M/s AMITY UNIVERSITY, MADHYA PRADESH
Gwalior, India 474005**

has been assessed by us for the green practices implemented at the institute in order to meet the requirement of

Green Audit

As per the findings outlined in the submitted report, it is verified that the green initiatives undertaken by the institute are deemed satisfactory.

The administration's commendable efforts to reduce the institute's carbon footprint are highly appreciated.

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GREEN AUDIT REPORT



AMITY UNIVERSITY

MADHYA PRADESH

Established vide Government of Madhya Pradesh Act No. 27 of 2010

Amity University
Madhya Pradesh, Gwalior

Submitted by:



Enviraj Consulting Private Limited
(An ISO 14001:2015 & 50001:2018 Certified Company)

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Executive Summary

This green audit aims to analyse green practices within the campus and a detailed account of the carbon footprint arising from the Institute internal operations in terms of carbon dioxide "equivalent" or CO₂e. This can assist the institute in comparing actions to get a sense of scale and the environmental effects of its activities and operations.

During the audit, data for FY 2021-22 was collected and analysed to identify various sources of carbon emissions, and the emissions from each source were determined. Furthermore, the carbon sequestration from the plants and green projects was evaluated, and the net emissions were calculated.

The institute's gross carbon emissions for FY 2021-22 are estimated to be 1,444.20 tonnes. Approximately 77.8 percent of gross emissions are attributed to electrical consumption, 9.5 percent to transportation, 7.8 percent to DG sets and 4.9 percent to LPG consumption, respectively. Whereas carbon sequestration from trees and solar energy export can offset the 633.81 tonnes of emissions. The net emissions of the institute for FY 2021-22 are estimated to be 773.57 tonnes.

1. Introduction

Climate Change is the defining issue of our time and we are at a defining moment. From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global in scope and unprecedented in scale.

With the rise in global population, economies, and living standards, the amount of greenhouse gases (GHGs) in the atmosphere has reached record levels, resulting in

global warming and climate change. To address this, governments and organizations around the world are pledging to achieve net-zero emissions of greenhouse gases. Government of India has launched a National Action Plan on Climate Change (NAPCC) outlining multiple National Missions on climate change, involving various stakeholders.

Educational institutions are the key stakeholders that plays an influential role in local and national level policymaking by informing society through research and educating graduates. It sets ground for imparting responsible perspectives to the young minds who act as successful incubators for innovation, from which many sustainability initiatives originate.

In this context, Amity University, Gwalior has been responsible and responsive to implementing green practises on campus, such as solar power, tree planting, rain water harvesting, solid waste management, and energy conservation.

To improve the efficacy and impact of green practises as well as to meet with NAAC Criteria 7; Institutional Values and Best Practices, the Institution has undergone the Green Audit. A green audit evaluates an organization's environmental impacts in terms of carbon footprint, while also suggests the ways to reduce it through resource conservation and effective resource utilisation, and raising environmental awareness.

About Institute

Amity University Madhya Pradesh was established by Ritnand Balved Education Foundation (RBEF) vide Madhya Pradesh Government Legislature Act of 2010 with the view to promote professional, industry-oriented education in the state of Madhya Pradesh. Amity University Madhya Pradesh, Gwalior located on a sprawling campus of 102 acres of land opposite Gwalior Airport, imparts modern, practical, and research-

oriented courses which will lead to the development of professionals who are employable and industry ready. This in turn will drive the socio-economic upliftment of the region.

Amity University Madhya Pradesh provides future-focused and market-oriented programmes in Management, Engineering, Biotechnology, Law, Communication, Nanotechnology, Behavioural Science, Pharmacy, Fashion Design, Architecture and Liberal Arts among others.

Amity University Madhya Pradesh was adjudged the “Best Private University of Madhya Pradesh” by CMAI Association of India and has been accredited as “Premier University” by Accreditation Service for International Colleges (ASIC) UK. Amity University Madhya Pradesh is No. 1 Best Private University in Madhya Pradesh and Ranked No. between 151 – 200 in the University category by National Institutional Ranking Framework (NIRF) India Ranking 2020 and Amity Institute of Engineering & Technology was All India Ranked 162nd in the Engineering Category for the year 2020. Amity University Madhya Pradesh is ranked 24th among the best 62 private universities in India with the overall score of 1157.0 by India’s Best Universities Ranking Survey 2021 conducted by India Today.



2. Objectives of the Audit

The objectives of green audit are:

- Identify key emission sources of GHG in the institute
- Compute Scope 1 & Scope 2 emissions
- Record plant diversity in the campus and assess the carbon sequestration potential
- Evaluate the carbon credits from the green projects (i.e., solar power plant)
- Estimate the gross and net emissions and provide recommendations on reducing carbon footprint of the Institute

3. Methodology

The methodology adopted for this audit was a three-step process comprising of:

- 1. Data collection:** In this phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements. Following steps were taken for data collection:
 - Site Visit
 - Data about the carbon emission sources, plants diversity was collected by observation and interview.
 - Electricity bills, solar power generation, LPG consumption data was collected from the responsible persons.
- 2. Data Analysis** - The carbon footprint analysis based on the international standard (*A Corporate Accounting and Reporting Standard*) was done for gross and net emissions estimation.
- 3. Findings & Recommendations** – On the basis data analysis results and site observations, steps for mitigating carbon footprint were recommended.

4. Findings and Recommendations

4.1 Carbon emissions

For GHG accounting and reporting purposes, Carbon emissions are typically divided into three scopes:

- Scopes 1 emissions are direct emissions occur from sources that are owned or controlled by the organization.
- Scope 2 are indirect emissions due to electricity import.
- Scope 3 covers other indirect emissions that are a consequence of the activities of the organization, but occur from sources not owned or controlled by it.

However, because of data limitations and the lack of a consistent standard for measuring Scope 3 emissions, this report is solely based on Scope 1 and scope 2 emissions.

4.1.1 Scope 1 Emissions

i. Diesel Generators

The institute is equipped with five diesel generators for the electricity backup. Below is the electricity production and diesel consumption data for FY 2021-22.

Month	Units generated kWh	Quantity of diesel (L)	Carbon Emissions (tonnes)
Apr'21	9,017.00	2,995.00	8.03
May'21	7,101.00	2,338.00	6.27
Jun'21	4,428.00	1,472.00	3.94
Jul'21	13,887.00	4,633.00	12.42
Aug'21	23,209.00	7,668.00	20.55
Sep'21	28,118.00	9,475.00	25.39
Oct'21	17,625.00	5,895.00	15.80
Nov'21	3,435.00	1,149.00	3.08
Dec'21	5,960.00	2,005.00	5.37
Jan'22	2.00	3.00	0.01

Feb'22	6,639.00	2,225.00	5.96
Mar'22	3,349.00	1,115.00	2.99
Total	1,22,770.00	40,973.00	109.81

*Diesel produces 2.68 kgs of CO₂ per litre burnt.

ii. Transportation

From the observation, two categories of vehicles that ply at the roads of the institute are: sedans and motorcycles. Data collection and subsequent analysis were done based on these categories. Due to unavailability of outside vehicle data, only vehicles domiciled on the campus, were considered in this report.

The following assumptions were made while estimating carbon emissions from the vehicles.

- All vehicles entering the campus use the main entrance gate.
- The average distance covered by each vehicle is 2.0 kilometres: this is the measured to and from distance between the main gate to the hostel/admin Buildings.

S. N	Vehicle Type	Nos	Emission Factor	Annual Emission
1	Motorcycles	700	0.12761kgCO ₂ e/km (WRI, 2008)	65.20-ton CO ₂ e
2	Sedans	400	0.23398kgCO ₂ e/km (IPCC, 2006)	68.32-ton CO ₂ e
Total Emissions				133.52 tonnes

iii. LPG Consumption

LPG is used in the hostel mess and canteen for cooking purposes. The mess contractors use 16kg commercial cylinders for this purpose. The contractors generally do not maintain accounts for LPG consumption data, but based on the interaction, an average annual LPG consumption in the institute is presented below:

Sr. No	Particulars	Observed Value	Unit
1	Annual LPG Consumption	23,040	kgs
2	LPG Emission Factor	2.983	--
3	Emissions	68.73	tonnes

4.1.2 Scope 2 Emissions: Electricity Import

The data from the 5-year energy audit indicates that the highest amount of electricity imported from the grid occurred in 2022. In educational institutions, electricity consumption is one of the main sources of carbon footprints. Therefore, since the electrical consumption was at its peak in 2022, the institutional carbon footprint was calculated for that year.

Sr. No	Particulars	Observed Value	Unit
1	Import from grid (Without Solar)	15,46,626	kWh
2	GHGs emission factor (India)*	0.7082	kgCO ₂ per kWh
3	Annual emissions	1,095.32	tonnes

*Climate Transparency report 2021

4.2 Carbon Sequestration from Trees

Estimating the amount of carbon sequestered by a single tree in one year is quite a complex process because it can vary depending on various factors such as the species of the tree, its age, size, and growing conditions. However, according to the Arbor Day Foundation, a mature tree can absorb more than 48 pounds (21.8 kg) of carbon dioxide (CO₂) per year through photosynthesis. Some other sources suggest that it can go up to 50 kg per year. For our estimation, we have taken an average of 25 kg of carbon dioxide absorbed by each tree in one year, irrespective of their size, age, and species.

The campus has over 9,765 native trees and 4,592 planted trees, with the potential to sequester approximately 358.93 tonnes of CO₂ per year.

4.2.1 Plants' diversity in the Institute

Sr. No	Plant Name	Type	Nos
1	Neem	Native	972
2	Dakhsni	Native	2039
3	Gulmohar	Native	183
4	Peepal	Native	6
5	Sheesham	Native	40
6	Raimaza	Native	1281
7	Khair	Native	2947
8	Heesh	Native	1185
9	Babul Desi	Native	75
10	Ber	Native	45
11	Anar	Native	3
12	Churail	Native	25
13	Hingota	Native	628
14	Ghot	Native	246
15	Kareel	Native	72
16	Shesho	Native	18
17	Amaltas	Planted	158
18	Gulmohar	Planted	67
19	Kushum	Planted	22
20	Boganbolia	Planted	1478
21	Kanair	Planted	727
22	Neem	Planted	603
23	Sheesham	Planted	193
24	Kanji	Planted	44
25	Maulshree	Planted	14
26	Arjun	Planted	176
27	Champa	Planted	521
28	Cycus	Planted	64
29	Alustinia	Planted	48
30	Tikoma	Planted	113
31	Bottle Brush	Planted	1
32	Bargad	Planted	2
33	Peepal	Planted	37
34	Kadam	Planted	17
35	Kalendera	Planted	49
36	Dhak	Planted	89
37	Dalmoth	Planted	12

38	Oomar	Planted	1
39	Palm	Planted	28
40	Alustonia	Planted	27
41	Bustoniya	Planted	99
42	Ambla	Planted	1
43	Shahtoot	Planted	1
Total			14,357

4.3 Carbon credits from Solar Power plant

Carbon credits represent a metric for measuring the reduction or removal of 1 ton of carbon emissions from the atmosphere resulting from a carbon-saving (green) project. In this case, a 307-kW grid-connected solar plant has been installed on campus, providing up to 15% of the total electricity needs of the institute, while also offsetting the institute's carbon footprint. The solar power generation data for the fiscal year 2021-22 is provided below.

S. N	Particulars	Observed Value	Unit
1	Total Solar Power Generation	3,88,141	kWh
2	GHGs emission factor	0.7082	kgCO ₂ per kWh
3	Carbon credit	274.88	tonnes

4.4 Gross and net carbon emissions of an Institute (Year: 2022)

Particulars	Sources/Sink	Value	Unit
A. Scope 1 Emissions	LPG	68.73	tonnes
	DG Sets	109.81	tonnes
	Transportation	133.52	tonnes
	Total A	312.06	tonnes
B. Scope 2 Emissions	Electricity from grid (without solar)	1,095.32	tonnes
C. Carbon offset	Sequestration from Trees	358.93	tonnes
	Carbon credits from solar	274.88	tonnes
	Total C	633.81	tonnes
Gross Emissions (A+B)		1407.38	tonnes

	Net Emissions (A+B-C)	773.57	tonnes
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The institute's net carbon emissions for the fiscal year 2021-22 were 773.57 tonnes, but they appeared lower than expected due to reduced energy consumption during COVID-19 lockdowns. In normal circumstances, the institute's carbon emissions would be 2.5-2.8 times higher than what was observed during the assessed period.

4.5 Recommendations

- ✓ The most of the emissions comes from the electricity import. Therefore, it is recommended the reduction in carbon emissions can be further done by usage of energy efficient appliances, smart switches and increasing the capacity of renewable energy system.
- ✓ Installing solar heating systems in the hostel area can reduce the electricity consumption required for water heating during winter months. This reduction in electricity consumption would also lead to a decrease in carbon emissions, making it a sustainable and eco-friendly solution.
- ✓ By considering natural lighting and air flow in a new construction and adhering to green building standards, it is possible to decrease the institute's carbon footprint.
- ✓ Bicycles shall replace motorbikes for internal commute. This will further reduce the emissions related to transportation.
- ✓ Emissions from outside vehicles can be included. The number of vehicles daily commuting in and out of the campus shall be determined by taking record of the numbers of each category of vehicle that enters the campus through its

main entrance between 06:00 hours and 23:59 hours for three weekdays and a weekend.

- ✓ Only tree plantation in the campus is accounted in the calculation. The total plantation around the campus may have further reduced the emissions.
- ✓ CO₂ sequestration from the soil can also be included after getting the effective area in the campus.
- ✓ Estimating CO₂ credits from other green projects/practices like rainwater harvesting, composting that are already present in the campus will have further reduced emissions.

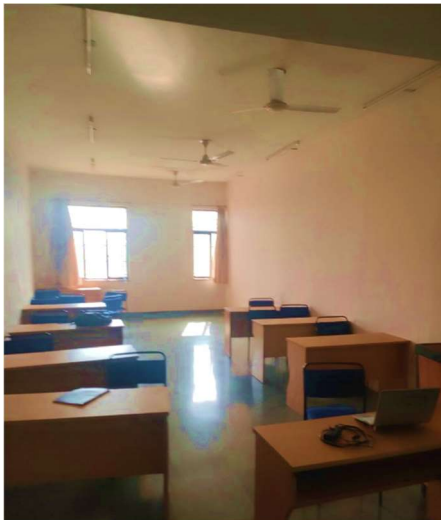
Annexure: Photographs



Greenery in campus



Tree Plantation in the campus



Natural light intensity in the classroom



Solar Power Plant