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CIN No. : U74999MP2018PTC045751

Ref No: EEPL/2020-21/JAN/C-11 **Date: 28/01/2021**

GREEN AUDIT CERTIFICATE

This is certified that the Green audit was conducted at **Mewar University, Chittorgarh (Rajasthan)** dated 18/01/2021 to 21/01/2021 (Four Days) and the audit report has been submitted by **Empirical Exergy Private Limited (EEPL), Indore**

We avail this opportunity to express our deep and sincere gratitude to the management for their wholehearted support and co-operations during the green audit.

This certificate is being issued based on the Green Audit conducted by EEPL.

For- Empirical Exergy Private Limited

Rajesh Kumar Singadiya (Director)
M.Tech (Energy Management),
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Lead Auditor ISO50001:2011 [EnMS] from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)

GREEN AUDIT REPORT

CONSULTATION REPORT

MEWAR UNIVERSITY

Gangrar Chittorgarh (Rajasthan)

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

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(2020-21)

CONTENT

ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore (M.P) takes this opportunity to appreciate & thank the management of **Mewar University Gangrar Chittorgarh for** allowing us to conduct the green audit for the university.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation during the study.

Rajesh Kumar Singadiya

(Director)

M.Tech (Energy Management), PhD (Research Scholar)
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Empanelled Energy Auditor with MPUVN, Bhopal M.P.
Lead Auditor ISO50001:2011 [EnMS) from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)
Charted Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]

CERTIFICATION OF ACCREDITATION

ENERGY IS LIFE
BEE
CONSERVE IT

BUREAU OF ENERGY EFFICIENCY

Examination Registration No.: EA- 7271

Accreditation Registration No.: AEA-284

Certificate of Accreditation

This is to certify that Mr./Ms. Shri. Rajesh Kumar Singadiya having its trade/registered office at ..... has been given accreditation as accredited energy auditor. The certificate shall be effective from 9th day of May, 2018

The certificate is subject to the provisions of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

This certificate shall be valid until it is cancelled under regulation 9 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

On cancellation, the certificate of accreditation shall be surrendered to the Bureau within fifteen days from the date of receipt of order of cancellation.

Your name has been entered at AEA No. 284 in the register of list of accredited energy auditors. Your name shall be liable to be struck out on the grounds specified in regulation 8 of the Bureau of Energy Efficiency (Qualifications for Accredited Energy Auditors and Maintenance of their List) Regulations, 2010.

Given under the seal of the Bureau of Energy Efficiency, Ministry of Power, this 5th day of October, 2018

Secretary,
Bureau of Energy Efficiency
New Delhi

Green Monitoring Committee.

OFFICE OF THE REGISTRAR
MEWAR UNIVERSITY, GANGRAR, CHITTORGARH (RAJ.)

Ref. No.MU/RO/2020/1293 11/12/2020

OFFICE ORDER

Subject:- Reconstitution of Green, Environment & Energy Auditing Committee.

Green Audit, Environment Audit & Energy Audit Committee is reconstituted to conduct the necessary audit in due course. Members of the Audit Committee are mentioned below:

Sr. No.	Name	Designation	Committee
1	Dr. Satish Kumar Sharma	Professor, Department of Agriculture	Co-Ordinator
2	Mr. Rakesh Kumar Singadiya	Director, Empirical Exergy Pvt.Ltd.	External Auditor
3	Mr. Gautam Singh Dhaked	Asst. Professor, Department of Agriculture	Internal Auditor
4	Dr. Satish Kumar Ameta	Asst. Professor, Department of Life Science	Internal Auditor
5	Mr. Deepak Kumar Joshi	Asst. Professor, Department of Electrical Engineering	Internal Auditor
6	Dr. Mohammad Ashid	Asst. Professor, Department of Chemistry	Member
7	Ms. Nirma Kumari Sharma	Asst. Professor, Department of Electrical Engineering	Member
8	Mr. Suraj Kumhar	Asst. Professor, Department of Electrical Engineering	Member
9	Mr. H. Widhani	OSD	Member
10	Mr. Narendra Kumar Ved	Non-Teaching Staff	Member
11	Mr. Bhagwan Suman	Non-Teaching Staff	Member

Registrar
Mewar University
Gangrar, Chittorgarh)
Registrar

Copy to:

1. PS to Hon'ble Chancellor (for kind information)
2. PS to Hon'ble President/Vice Chancellor(for kind information)
3. All Officers/Deans/Directors/Hod's
4. IT Section/Accounts Dept./All Staff
5. Coordinator – IQAC Cell
6. Record File

The Audit Team

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited,**

- **Mr. Rajesh Kumar Singadiya** [Director & Accredited Energy Auditor AEA-0284]
- **Mr. Rakesh Pathak**, [Director & Electrical Expert]
- **Dr. Suresh Kumar Soni** [Certified Energy Auditor & Energy Expert]
- **Mr. Sachin Kumawat** [Sr. Project Engineer]
- **Mr. Aakash Kumawat** [Site Engineer]
- **Mr. Ajay Nahra,** [Sr. Accountant & admin]

EXECUTIVE SUMMARY

Green Initiative Taken by University

- **CAMPAIGN OF PLANTATION AND GREEN CAMPUS:**

  University has around **1,561** trees on campus. It's a good initiative taken by management for a green campus under the campaign of a plantation. **It's APPRECIABLE.**

- **480 KWp SOLAR PHOTOVOLTAIC ROOFTOP INSTALLATION:**

  University has a 480 KWp solar photovoltaic rooftop grid-connected system installed on most of the buildings. Total unit generation from July 2020 to June 2021 is **6,29,936** units. The solar unit generated for the year 2020-21 is 6,29,936 units.

  - **Vermicompost unit:** University has installed 05 no of vermicompost pit **It's appreciable**. All type of agricultural waste decomposes in the pit and prepare good quality environmentally-friendly manure is formed from the compost It is to be used for agricultural purposes on the university campus.

RECOMMENDATION: -

- **SOLID WASTE MANAGEMENT:**
  The basic principle of good waste management practice is based on the concept of 3Rs, namely, reduce, recycle, and reuse. All the degradable and non-degradable waste materials are collected and processed in an environmentally friendly way on the University campus.

- **Biodegradable and non-biodegradable:** Waste materials are collected with help of different colored three dustbin systems on the campus.

- **Organic converter:** - There is good potential for the installation of an organic converter in the university for all types of kitchen and vegetable waste generated from the guesthouse, and the hostel's mess.

- **QR Code system**

  While the world seems to be going digital, people lack the time to read books and process the information they contain. Hence, it is recommend to install QR code system on tress

CHAPTER-1
INTRODUCTION

1.1 About University

Mewar University is an autonomous body set up by the Government of Rajasthan through Act. No. 4 of 2009 passed by the Rajasthan Legislative Assembly (Government of Rajasthan). The University is recognized by the UGC u/s 2(f) of UGC Act with powers to confer degrees u/s 22(1) of the UGC Act, 1956 vide their letter no. F.9-15/2009(CPP-I) dated 30th March 2009. This is the only private and self-financed University in Rajasthan which is also approved by the UGC u/s 12B of the UGC Act vide their letter No. F.9-15/2009 (CPP-I/PU) dated15th October 2018. The University is also NAAC accredited.

Mewar University has never affiliated with any institution, nor has the University ever set up any study center in any part of the country other than its main campus at Gangrar in Chittorgarh (Rajasthan).

Mewar University is promoted by the Mewar Education Society (MES). It is controlled by a Board of Management, constituted by the MES, which is headed by Chairperson Shri Ashok Kumar Gadiya, a great visionary, educationist, and nationalist, who translated his ideas and dreams of promoting higher education into reality by setting up institutes of learning in various subjects. In no time, he has carved out a niche for himself as an educationist, who believes in the inculcation of values through education in the young generation.

The group, under the able leadership of Dr.Ashok Kumar Gadiya and the active support and association of renowned academicians, experienced professionals, and technocrats, has established a chain of Institutes of higher education and learning:

- **Mewar Institute of Management**

  Mewar Institute of Management, Vasundhara, Ghaziabad (U.P.) [Approved by the UGC and affiliated with C.C.S. University, Meerut, conducting courses for B.B.A., M.B.A., B.C.A., M.C.S., M.I.S., B.Ed, B.Lib, and M.Sc. (Biotech)]

- **Mewar Law Institute**

  Mewar Law Institute, Vasundhara, Ghaziabad (U.P.) [Approved by the UGC, Bar Council of India and affiliated to C.C.S. University, Meerut, conducting courses for L.L.B. (3Yrs) & L.L.B. (5Yrs)]

- **Mewar Girls Business School**

  MewarGirls Business School, Vasundhara, Ghaziabad (U.P.) [Approved by the AICTE and affiliated to UP Tech University, Lucknow, conducting M.B.A. courses for Girls]

- **Mewar Girls College**

  MewarGirls College, Chittorgarh [Approved by Government of Rajasthan and affiliated to Mohan Lal Sukhadia University, Udaipur, conducting courses for M.I.B., B.Sc (Biotech.), B.B.M., B.C.A. & P.G.D.C.A.]

- **Mewar Girls Ayurved Nursing Centre**

  Mewar Girls Ayurved Nursing Centre, Chittorgarh [Approved by Government of Rajasthan and affiliated to Rajasthan Ayurved University, Jodhpur, conducting courses for Ayurved Nursing]

- **Mewar Girls Industrial Training Centre**

  Mewar Girls Industrial Training Centre, Chittorgarh [Approved by Government of India (NCVT) and Board of Technical Education, Jodhpur, (SCVT), conducting courses for Computer Operator and Programming Assistant, Interior Decoration, Fashion Designing, Dress Making, English Language Proficiency and Personality Development]

- **Mewar Girls College of Teachers Training**

  Mewar Girls College of Teachers Training, Chittorgarh [Approved by Government of India (NCTE) and affiliated to Mohan Lal Sukhadia University, Udaipur, conducting courses for B.Ed., N.T.T, S.T.C]

  These centers of learning exemplify the group's mission to promote quality technical and higher education. And as a result, the number of students has gone up considerably, and now it has more than 10,000 students on its campuses.

  The group, continuing with its mission to provide higher and technical education to a larger section of people, has touched a new height by promoting and sponsoring Mewar University. The promoting body, with its honest efforts and unstinting dedication, has the conviction to build a strong partnership with the Government of Rajasthan for ensuring the spread of higher and technical education in the state.

  Mewar's culture, ethos, tradition, and values are so ingrained in its soil that it is bestowed with the magical powers to sprout prodigious talent and genius. Anyone groomed in this environment will undergo a steady transformation to blossom in life and imbibe the traits of greatness associated with this historical place.

VISION:-

To develop a center of excellence for technical, professional, and vocational education and research at par with national and international standards.

MISSION:-

To develop the framework for effectively conducting various educational and research programmes of the highest standards to produce confident, self-reliant, and responsible youth for society and outstanding professionals for government, industry, and business. The mission is to "**Reach the unreached**"

Objective:-

- Provide easy access to high-quality education in Management, Engineering, as well as other academic & professional fields to its students, irrespective of their caste, creed, age, gender, region, or country, at an affordable cost.
- To offer a conducive environment for pursuing research and vocational studies with a market-driven orientation.
- To expose students to new ideas, fresh vision, and pragmatic ambition, and enhance their competency in the ever-changing business environment.
- To provide a flexible choice-based credit system of education and dual-degree programmes while flexible adopting modes of delivery to suit students' requirements of learning.
- To prepare and assist students in improving their future prospects through career counseling and placement support, on-the-job training, industrial visits, presentations, and group discussions.
- To Promote and practice a convenient distance education concept in India and abroad.
- To spread job-oriented Skill Development education in rural and tribal areas

1.2 About Campus: -

Table 1.1 Details are the total build-up area given in the table:-

TOTAL GROUND COVERED. =20856.78 SQ.MT										
TOTAL OVERALL BUILT-UP ALL FLOORS AREA:- 76024.72 SQ.MT										
S.NO	BLOCK	FAR AREA					BUILT AREA			
		GROUND FLOOR AREA IN SQ.MT	FIRST FLOOR AREA IN SQ.MT	SECOND FLOOR AREA IN SQ.MT	THIRD FLOOR AREA IN SQ.MT		GROUND FLOOR AREA IN SQ.MT	FIRST FLOOR SQ.MT	SECOND FLOOR AREA IN SQ.MT	THIRD FLOOR AREA IN SQ.MT
1	ADMINISTRATIVE AND ACADEMIC BLOCK.	8890.84	8519.33	8675.24	8675.24		8966.05	9050.97	9206.74	9206.74
2	EDUCATION BLOCK	1062.08	1170.08	1062.08	1062.1		1193.08	1253.27	1126.29	1126.29
3	ENGINEERINGBLOCK	1979.9	11979.9	1979.9	0		2126.84	2093.74	2093.74	0
4	MEWAR HOSPITAL	1337.03	1337.03	0	0		1590.91	1590.91	0	0
5	BHAMASHAH HOSTEL	1382.11	1382.11	1382.11	1382.1		1601.64	1572.82	1572.82	1572.82
6	SANGA HOSTEL	1189.78	1189.78	1189.78	1189.8		1359.6	1341.62	1341.62	1341.62
7	KUMBHA HOSTEL	602.71	602.71	620.65	620.65		709.19	697.35	697.35	697.35
8	PRATAP HOSTEL	640.52	640.52	665.78	665.78		749.38	739.64	739.64	739.64

S.NO	BLOCK	FAR AREA				BUILT AREA			
		GROUND FLOOR AREA IN SQ.MT	FIRST FLOOR AREA IN SQ.MT	SECOND FLOOR AREA IN SQ.MT	THIRD FLOOR AREA IN SQ.MT	GROUND FLOOR AREA IN SQ.MT	FIRST FLOOR SQ.MT	SECOND FLOOR AREA IN SQ.MT	THIRD FLOOR AREA IN SQ.MT
9	PANNA DHAI HOSTEL	376.53	376.53	382.3	382.3	447.6	435.97	435.97	435.97
10	MEERA HOSTEL	323.13	323.13	323.13	323.13	386.87	381.68	381.68	381.68
11	GUEST HOUSE	229.94	223.58	223.58	223.58	295.78	258.82	258.82	258.82
12	STAFF QUARTERS(1 BHK)	285.11	285.11	285.11	285.11	367.6	362.67	362.67	362.67
13	STAFF QUARTER	276.99	276.99	276.99	276.99	353.84	349.18	349.18	349.18
14	ANNAPURNA MESS	613.7	0	0	0	708.4	0	0	0
	TOTAL	19190.37	28306.8	17066.65	15086.78	20856.78	20128.64	18566.52	16472.78

Satellite Image of Mewar university from Google map

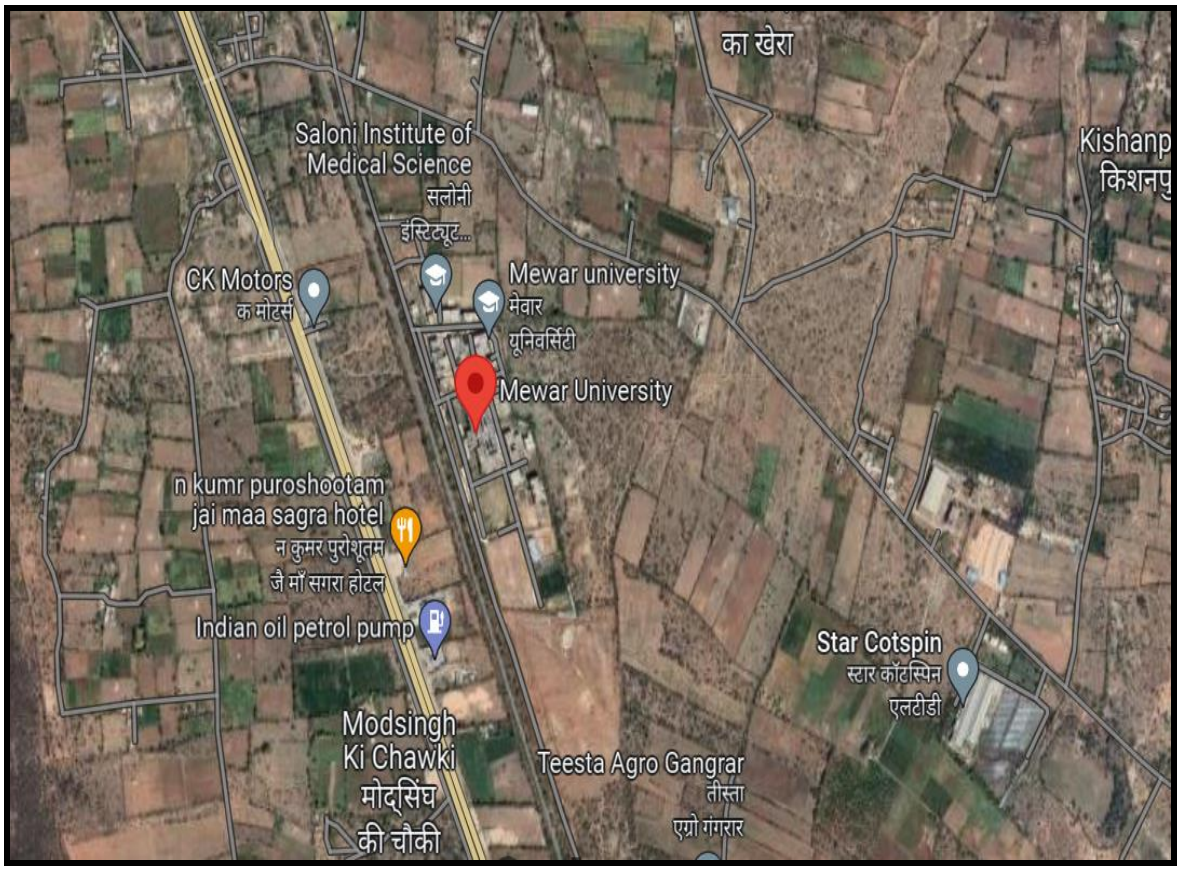
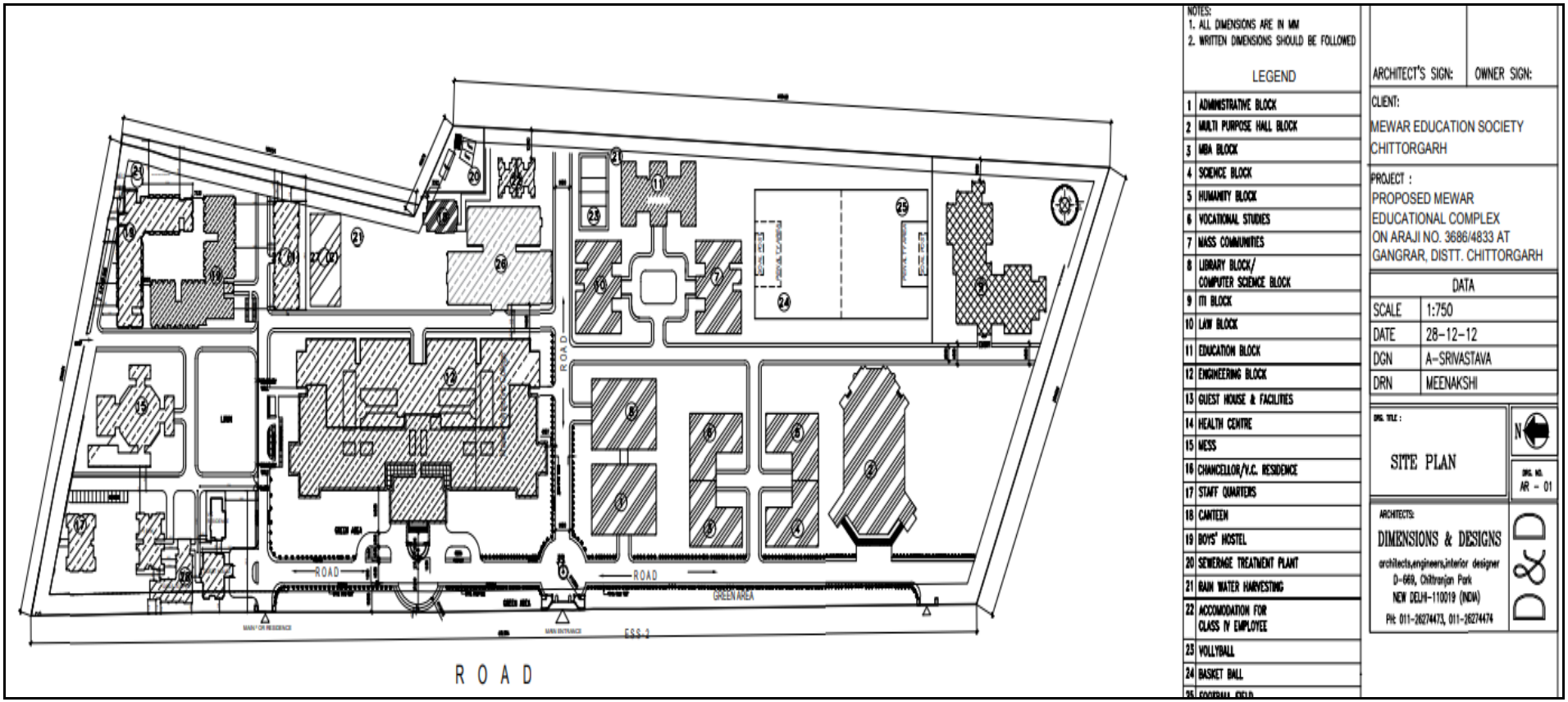


Figure 1.1: - Satellite Image of Mewar university from Google map

1.3 MEWAR UNIVERSITY LAYOUT OF VARIOUS BUILDINGS

Layout map of Mewar University



1.4 About Green Auditing

Eco campus is a concept implemented in many educational institutions, all over the world to make them sustainable because of their mass resource utilization and waste discharge into the environment.

Green audit means to identify opportunities for sustainable development practices, enhance environmental quality, improve health, hygiene, and safety, reduce liabilities achieve values of virtue. A green audit also provides a basis for calculating the economic benefits of resource conservation projects by establishing the current rates of resource use and their associated costs.

Green auditing of **"Mewar University"** enables assessment of the lifestyle, action, and its impact on the environment. This green audit was mainly focused on greening indicators like utilization of green energy (solar energy) and optimum use of secondary energy sources (petrol and diesel) in the University campus, vegetation, carbon footprint of the campus, etc. Green auditing aims to help the institution to apply sustainable development practices and to set examples before the community and young learners.

1.5 Objectives of Green Auditing

The general objective of a green audit is to prepare a baseline report on "Green campus" and alternative energy sources (solar energy), measures to mitigate resource wastage, and improve sustainable practices.

The specific objectives are:

- To inculcate values of sustainable development practices through a green audit mechanism.
- Providing a database for corrective actions and plans.
- To identify the gap areas and suggest recommendations to improve the green campus status of the University.

CHAPTER- 2
GREEN AUDIT

2.1 Green Audit

In the survey, the focus has been given to the assessment of the present status of plants and trees on the university campus and efforts made by the university authorities for nature conservation. The campus is in the vicinity of approximately more than 1,685 trees/medicinal herbs/ornamental plants. The detail is given below:

Figure .2.1 Green Campus

2.2 List of plants in the university campus.

Sr. No	Common name	Botanical Name	Quantity
1	Neem	Azadirachta indica	60
2	Kadamba	Neolamarckia kadamba	6
3	Drum Stick	Moringa oleifera	15
4	Peepal	Ficus religiosa	5
5	Desi Babul	Acacia nilotica	26
6	Siris	Albezia lebbeck	28
7	Shisham	Dalbergia sissoo	20
8	Arjun	Terminalia arjuna	22
9	Ashapala	Polyalthia longifolia	45
10	Rudrax	Elaeocarpus ganitrus	4
11	Royal Palms	Roystonea rigia	10
12	Vilayati Babul	Prosopis juliflora	32
13	Monkey Puzzled Tree	Araucaria heterophylla	15
14	Indian Laburnum	Cassia fistula	18
15	Bel	Aegle marmelos	19
16	Geiger Tree	Cordia sebestena	17
17	Siamea Tree	Cassia siamea	32
18	Pagoda Tree	Plumeria rubra	37
19	Kachnar	Bauhinia variegate	73
20	Devil Tree	Alstonia scholaris	56
21	Gulmohar	Delonix regia	43
22	Silver Oak	Grevillea robusta	7
23	Ashapala	Polyalthia longifolia	45
24	Ashoka	Saraca asoca	25
25	Benjamina	Ficus benjamina	36
26	Date Palms	Phoenix dactylifera	18
27	Amla	Emblica officinalis	35
28	Mango	Mangifera indica	24
29	Guava	Psidium gujava	10
30	Mulberry	Morus alba	4
31	Jamun	Syzygium cumini	15
32	Jackfruit	Artocarpus heterophyllus	18
33	Ber	Ziziphus mauritiana	10
34	Pears	Pyrus spp.	14
35	Lemon	Citrus lemon	25
36	White Champa	Plumeria alba	67

Sr. No	Common name	Botanical Name	Quantity
37	Rose	Rosa indica	76
38	Duranta	Golden duranta	26
39	Mehndi	Lawsonia inermis	18
40	Kaner	Nerium oleander	27
41	White Cedar	Thuja occisentalis	18
42	China Rose	Hibiscus rosa-sinensis	37
43	Golden Durant	Duranta erecta	30
44	Harsringar	Nyctanthes arbor-tristis	25
45	Patharchatta	Bryophyllum pinnatum	17
46	Tulsi	Ocimum tenuiflorum	65
47	Sarpaganda	Rauvolfia serpentine	56
48	Lemon	Citrus limon (L.)	40
49	Ashwaganda	Withania somnifera	19
50	Beach Launaea	Launaea sarmentosa	17
51	Aloe Vera	Aloe barbadensis Mill.	28
52	Lemon Grass	Cymbopogon citrates	34
53	Chaff-Flower	Achyranthes aspera	7
54	Ajwain	Trachyspermum ammi	20
55	Kalmegh	Andrographis paniculata	21
56	Satawar	Asparagus racemosus	18
57	Giloey	Tinospora cordifolia	19
58	Harad	Terminalia chebula	7
		Total	**1561**

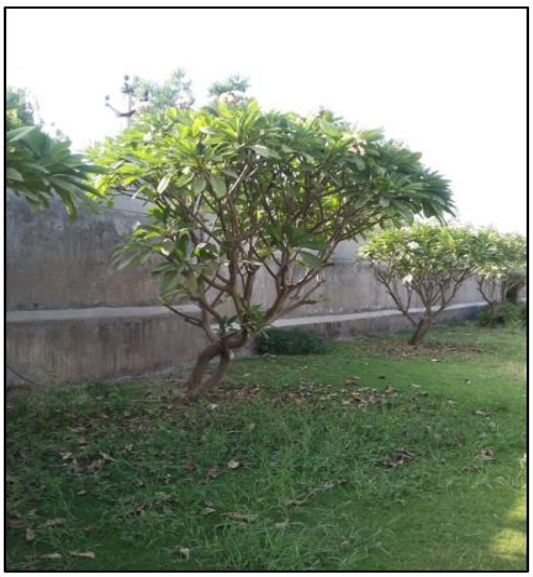
University has **1561 trees** on the campus. This is a good initiative taken by management for a green campus under the campaign of the plantation. **It's APPRECIABLE**

Some Photographs of Green Campus

Anthocephalus Cadamba (Kadamb)

Bauhinia variegata (Kachnar)

Nyctanthes arbor-tristis (Harsinghar)



Plumaria rubra (Champa)

CHAPTER- 3
SOLAR PHOTOVOLTAIC SYSTEM

3.1 Grid Connected Solar Photovoltaic System (480 KWp)

There are 480 KWp solar photovoltaic rooftop grid-connected systems installed on most buildings. System details are given below:

Sr. No	Description	Technical Specification
1	Plant Information	
1.1	Plant capacity	480 KWp
1.2	Locations	1. Main University building. 2. Kumbha Hostel building. 3. Pratap Hostel building. 4. Sanga Hostel building. 5. Mess Buildinhg 6. Panna Dhai Girls Hostel . 7. Meera Girls Hostel.
1.3	Latitude & Longitude	23.3103 N & 77.3619 E
2	PV Panel Details	
2.1	Make	M/s. Goldi Green Technologies Pvt. Ltd
2.2	Panel Type	Poly-crystalline
2.3	Panel Wattage	320 Wp
2.4	No of PV Panels	1478
2.5	Total Capacity	480 kWp
3	Inverter Information	
3.1	Make	KSTAR
3.2	Model	1. KSG-50K = 04 2. KSG-20K = 06 3. KSG-15K = 01 4. KSG-20K =05
3.3	Capacity	480 Kw

Sr. No	Building Name	Total No of Inverter	Inverter Modal	No of Penal
1	University Main Building	2	KSG-20 K	730
		4	KSG-50 K	
2	Kumbha Hostel	2	KSG-20 K	110
3	Pratap Hostel	1	KSG-15 K	108
		1	KSG-20 K	
4	Sanga Hostel	2	KSG-30 K	190
5	Mess	2	KSG-30 K	190
6	Panna Dhai Hostel	1	KSG-20 K	60
7	Meera Girls Hostel	1	KSG-30 K	90

Photographs of Solar Plant:-

Figure 3.1:- Solar Plant 480 KWp and Inverter System

Total Solar unit generation :-

Table 3.2:- Total Solar Unit generation from date of installation to june-2021 is 16,14,373, & july-2020 to june-2021 solar unit generation is 6,29,936 units

Sr. No	Year	Unit
1	2018-19	4,15,350
2	2019-20	5,69,087
3	2020-21	6,29,936
	Total	**16,14,373**

Chapter-04
Carbon Footprint

4.1 About Carbon footprint.

Climate change is one of the biggest challenges faced by the world, nations, governments, institutions, businesses, and mankind today.

Carbon footprint is a measure of the impact your activities have on the amount of carbon dioxide (CO_2) produced through the burning of fossil fuels and is expressed as a weight of CO_2 emissions produced in tonnes.

We focus on consumption in each of our five major categories: housing, travel, food, products, and services. In addition to these, we also estimate the share of national emissions over which we have little control, government purchases, and capital investment.

For simplicity and clarity, all our calculations follow one basic method. We multiply a user input by an emissions factor to calculate each footprint. All use inputs are per individual and include things like fuel use, distance, calorie consumption, and expenditure. Working out your inputs is a matter of estimating them from your home, travel, diet, and spending behavior.

Although working out your inputs can take some investigation on your part the much more challenging aspect of carbon calculations is estimating the appropriate emissions factor to use in your calculation. Where possible you want this emissions factor to account for as much of the relevant life cycle as possible.

We all have a carbon footprint…

4.2 Methodology and scope

The carbon footprint gives a general overview of the Mewar University greenhouse gas emissions, converted into CO_2 -equivalents and it is based on reported data from internal and external systems. The purposes of the carbon indicators are to measure the carbon intensity per unit of product, in addition to showing environmental transparency towards external stakeholders. The carbon footprint reporting approach undertaken in this study follows the guidelines and principles set out in the "Greenhouse Gas Protocol Corporate Accounting and Reporting Standard" (hereafter referred to as the GHG Protocol) developed by the Greenhouse Gas Protocol Initiative and international standard for the quantification and reporting of greenhouse gas emissions -ISO 14064. This is the most widely used and accepted methodology for conducting corporate carbon footprints. The study has assessed carbon emissions from the Mewar University Campus. This involves accounting for and reporting on, the GHG emissions from all those activities for which the company is directly responsible. The items quantified in this study are as classified under the ISO 14064 standards: The report calculates the greenhouse gas emissions from Mewar University. This includes electricity, as well as emissions associated with diesel consumption in the institute vehicle. The emission associated with air travel, waste generation, administration, and marketing-related activities has been excluded from the current study. Emissions from business activities are generally classified as scope 1, 2, or 3 areas classified under the ISO 14064 standards.

4.3 Carbon emission from electricity

Direct emissions factors are widely published and show the number of emissions produced by power stations to produce an average kilowatt-hour within that grid region

Unlike other energy sources, the carbon intensity of electricity varies greatly depending on how it is produced and transmitted. For most of us, the electricity we use comes from the grid and is produced from a wide variety of sources. Although working out the carbon intensity of this mix is difficult, most of the work is generally done for us.

Electricity used in the site is a significant contributor to GHGs emissions from the unit. Electricity used onsite is the most direct, and typically the most significant, a contributor to a unit's carbon footprint. Thus, using an average fuel mix for generating electricity, the carbon dioxide intensity of electricity for the national grid is assumed to be 0.9613 KgCO2/Kwh

(Reference: Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/database_11.zip). Electricity is purchased from the grid

Table:- 4.1 Electricity Purchased from the grid and Emissions from the electricity Import

Sr. no	Year	Total unit Consumption by AVVNL	Unit	Emission Factor kg CO^2e/kWh	Emission ton CO^2e/year
4	2020-21	5,67,163	kWh	0.9613	545.2
	Total	**5,67,163**		**Total**	**545.2**

Observation:-

Total CO_2 Emission by indirectly from electricity is 545 Ton CO_2 e/year in 2021-22.

4.4 Biomass Calculation and CO^2 Sequestration of the Trees: -

1. Estimation of above-ground biomass (AGB)

$$K= 34.4703 – 8.0671D + 0.6589 D^2$$

Where = K is above-ground biomass.
D is Breast height diameter in (cm)

1 Estimation of below ground biomass (BGD)

$$BGB = AGB \times 0.15$$

2 Total Biomass (TB)

$$TB = AGB + BGB$$

3 Calculation of carbon dioxide Weight sequestered in the tree in Kg.

$$C = W \times 0.50$$

4 Calculate the weight of CO_2 sequestered in the tree per year in Kg.

$$CO_2 = C \times 3.666$$

Where: -

AGB = Above ground biomass.

D = Diameter of tree breast height.

BGB = Below Ground Biomass.

C = Carbon

TB = Total Biomass.

Biomass calculation of the tree

Sr. no	Common Name	Average Daimeter CM (25 to 100)	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	No of Tree	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount	Total Co2 Sequestered Ton/Year
1	Neem	75	3248	487	3735	1868	6847	60	410829.86	5603.24	5.60
2	Kadamba	60	1994	299	2294	1147	4204	6	25225.71	344.05	0.34
3	Drum Stick	50	1328	199	1528	764	2800	15	42002.06	572.86	0.57
4	Peepal	50	1328	199	1528	764	2800	5	14000.69	190.95	0.19
5	Desi Babul	40	798	120	918	459	1682	26	43737.39	596.53	0.60
6	Siris	55	1644	247	1891	946	3466	28	97060.16	1323.79	1.32
7	Shisham	40	798	120	918	459	1682	20	33644.15	458.87	0.46
8	Arjun	65	2378	357	2735	1368	5014	22	110301.19	1504.38	1.50
9	Ashapala	30	403	61	464	232	850	45	38272.26	521.99	0.52
10	Rudrax	30	403	61	464	232	850	4	3401.98	46.40	0.05
11	Royal Palms	30	403	61	464	232	850	10	8504.95	116.00	0.12
12	Vilayati Babul	35	584	88	671	336	1231	32	39378.36	537.08	0.54
13	Monkey Puzzled Tree	45	1046	157	1203	602	2205	15	33080.93	451.19	0.45
14	Indian Laburnum	50	1328	199	1528	764	2800	18	50402.48	687.43	0.69
15	Bel	36	624	94	717	359	1315	19	24988.35	340.81	0.34

Sr. no	Common Name	Average Daimeter CM (25 to 100)	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	No of Tree	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount	Total Co2 Sequestered Ton/Year
16	Geiger Tree	35	584	88	671	336	1231	17	20919.75	285.32	0.29
17	Siamea Tree	45	1046	157	1203	602	2205	32	70572.65	962.53	0.96
18	Pagoda Tree	60	1994	299	2294	1147	4204	37	155558.55	2121.64	2.12
19	Kachnar	45	1046	157	1203	602	2205	73	160993.85	2195.77	2.20
20	Devil Tree	40	798	120	918	459	1682	56	94203.61	1284.83	1.28
21	Gulmohar	30	403	61	464	232	850	43	36571.27	498.79	0.50
22	Silver Oak	65	2378	357	2735	1368	5014	7	35095.83	478.67	0.48
23	Ashapala	65	2378	357	2735	1368	5014	45	225616.08	3077.14	3.08
24	Ashoka	25	257	39	296	148	542	25	13549.24	184.80	0.18
25	Benjamina	35	584	88	671	336	1231	36	44300.66	604.21	0.60
26	Date Palms	36	624	94	717	359	1315	18	23673.17	322.87	0.32
27	Amla	30	403	61	464	232	850	35	29767.31	405.99	0.41
28	Mango	27	312	47	358	179	657	24	15763.04	214.99	0.21
29	Guava	28	341	51	392	196	718	10	7184.98	97.99	0.10
30	Mulberry	30	403	61	464	232	850	4	3401.98	46.40	0.05
31	Jamun	54	1579	237	1815	908	3327	15	49911.76	680.74	0.68
32	Jackfruit	35	584	88	671	336	1231	18	22150.33	302.10	0.30

Sr. no	Common Name	Average Daimeter CM (25 to 100)	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	No of Tree	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount	Total Co2 Sequestered Ton/Year
33	Ber	37	665	100	765	383	1403	10	14026.41	191.30	0.19
34	Pears	45	1046	157	1203	602	2205	14	30875.53	421.11	0.42
35	Lemon	15	66	10	76	38	140	25	3489.58	47.59	0.05
36	White Champa	26	284	43	326	163	598	67	40062.67	546.41	0.55
37	Rose	75	3248	487	3735	1868	6847	76	520384.49	7097.44	7.10
38	Duranta	45	1046	157	1203	602	2205	26	57340.28	782.06	0.78
39	Mehndi	30	403	61	464	232	850	18	15308.90	208.80	0.21
40	Kaner	30	403	61	464	232	850	27	22963.35	313.19	0.31
41	White Cedar	25	257	39	296	148	542	18	9755.46	133.05	0.13
42	China Rose	46	1100	165	1265	632	2319	37	85788.92	1170.06	1.17
43	Golden Durant	54	1579	237	1815	908	3327	30	99823.52	1361.48	1.36
44	Harsringar	28	341	51	392	196	718	25	17962.45	244.99	0.24
45	Patharchatta	50	1328	199	1528	764	2800	17	47602.34	649.24	0.65
46	Tulsi	36	624	94	717	359	1315	65	85486.45	1165.94	1.17
47	Sarpaganda	39	752	113	865	433	1586	56	88824.75	1211.47	1.21
48	Lemon	36	624	94	717	359	1315	40	52607.05	717.50	0.72

Sr. no	Common Name	Average Daimeter CM (25 to 100)	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	No of Tree	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount	Total Co2 Sequestered Ton/Year
49	Ashwagand a	45	1046	157	1203	602	2205	19	41902.51	571.50	0.57
50	Beach Launaea	46	1100	165	1265	632	2319	17	39416.53	537.60	0.54
51	Aloe Vera	35	584	88	671	336	1231	28	34456.07	469.94	0.47
52	Lemon Grass	26	284	43	326	163	598	34	20330.31	277.28	0.28
53	Chaff-Flower	80	3734	560	4294	2147	7871	7	55098.63	751.48	0.75
54	Ajwain	75	3248	487	3735	1868	6847	20	136943.29	1867.75	1.87
55	Kalmegh	36	624	94	717	359	1315	21	27618.70	376.69	0.38
56	Satawar	37	665	100	765	383	1403	18	25247.53	344.35	0.34
57	Giloey	57	1780	267	2047	1024	3753	19	71306.77	972.54	0.97
58	Harad	50	1328	199	1528	764	2800	7	19600.96	267.33	0.27
		Total	**62188.8**	**9328.3**	**71517.2**	**35758.6**	**131091.0**	**1561**	**3648288.02**	**49758.43**	**49.76**

University has **1685 trees** on campus. This is a good initiative taken by management for a green campus under the campaign of the plantation.

It's APPRECIABLE.

There are total CO_2 sequestered of **49758 Kg /year or 49.76Tons /Year.**

Calculation of CO_2 Emission of Mewar University: -

CO_2 Emission Neutralize by the Solar 2020-21: -

July -2020 to June -2021 = 6,29,936 Kwh

6,29,936 X 0.9613 = 6,05,557 Kg/year

6,05,557 / 1000 = 605.557 Ton/year

Total Carbon Footprint generated by the campus = Carbon footprint by electricity

-

Carbon Neutralize by the tree,

-

Carbon Neutralize by Solar

(Electricity – (solar + trees))
Total Carbon Foot print by campus: (545.2) – (605.55 + 49.76) = (- 110.11)

It is observ that CO2 emission of the year 2020-21 is -110 Ton/year due to less energy consumption from covid

4.7 Other Emissions Excluded

This study did not evaluate the carbon sequestration potential of existing plantation activities and emissions from the staff commuting, food supply, official flights, paper products, water supply, and waste disposal and recycling due to limited data availability. The current study identifies areas where data monitoring, recording, and archiving need to be developed for enlarging the scope of mapping of GHGs emissions in the future years. Accordingly, a set of tools and record-keeping procedures will be developed for improving the quality of data collection for the next year's carbon footprint studies.

CHAPTER- 5
WASTE MANAGEMENT

5.1 About Waste:

Human activities create waste, and it is the way these wastes are handled, stored, collected, and disposed of, which can pose risks to the environment and public health waste management is important for an eco-friendly campus. In universities, different types of waste are generated, and its collection and management are very challenging.

Solid waste can be divided into three categories: biodegradable, non-biodegradable and hazardous waste. A bio-degradable waste includes food waste, canteen waste, wastes from toilets, etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles, etc. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids, and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated at the University. Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid waste is essential to a sustainable University. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

Table 5.1 Different types of waste generated on the University Campus.

Sr. No.	Types of Waste	Particulars
1	Solid wastes	Damaged furniture, paper waste, paper plates, food waste, etc
2	Plastic waste	Pen, Refill, Plastic water bottles and other plastic containers, wrappers, etc
3	E-Waste	Computers, electrical and electronic parts, etc
4	Glass waste	Broken glass wares from the labs etc
5	Chemical wastes	Laboratory waste etc
6	Bio-medical Waste	Sanitary Napkin etc

5.2 Waste Management Practices adopted by the University

University has implemented a **"Three dust bin"** waste collection system and has banned the use of plastic bags, **It's Appreciable**.

Figure: - 5.1 Three Dustbin Collection system on the university campus

Vermicompost pit

University Vegetable waste and other leaf liters were used to feed in the **"Vermicompost pit"** and the resulting vermin cast is used as manure in the garden. All kinds of waste generated from the various activities are collected.

Figure: - 5.1 Varmi Compost pit.

5.3 Waste Collection Points:

The audit team also visited various departments, Admin building, MBA building, Workshop building, and Mess, to find out waste generation areas and waste collection points for further improvement. Details are given in the table.

Table: 5.2 Detailed Waste collection Dust bin system

Administrative and Academic Block		
Sr.No.	**Location**	**Dustbin**
1	Basement	8
2	First floor	6
3	Second floor	6
4	Third floor	3
	Total	**22**
Education Block		
Sr.No.	**Location**	**Dustbin**
1	Ground floor	5
2	First floor	5
3	Second floor	6
4	Third floor	5
	Total	**21**
Engineering Block		
Sr.No.	**Location**	**Dustbin**
1	Ground floor	5
2	First floor	5
3	Second floor	6
	Total	**16**

Sr.No.	**Location**	**Dustbin**
1	Bhamashah International Hostel	14
2	Sanga Boys Hostel	10
3	Kumbha Boys Hostel	12
4	Pratap Boys Hostel	4
5	Panna Dhai Girls Hostel	6
6	SC Meera Girls Hostel	4
	Total	**50**

Observation:- Total dustbins is more than 100 in the university. **It's Appreciable.**

5.4 Organic Waste Generation in university

- The audit Team also visited in mess and guest house and discussion with the concerned officer the waste collection process. University has approx. 50 Kg per day waste generated. Department wise Generated organic waste is as follows: -

Recommended:- Install an Organic waste composting Machine in the university: -

An organic waste composting machine is an independent unit that facilitates the composting process and provides better compost. It takes waste as its input and provides manure as its output. Composting without an organic waste composting machine will take a considerable amount of time.

About Composting Process: -

Highly compact composting machine, which uses special microorganisms to break down and decompose all kinds of organic waste into compost within 24 hrs with a volume reduction of 85-90%. When organic waste is added to it, moisture is sensed by the humidity sensor, heater, mixing blades, and an exhaust system.

Recommendation: -

University has a good potential to install an organic converter.

END OF THE REPORT

THANKS