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Green Audit of Nanasaheb Mahadik College of Engineering Peth

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Abstract: ***A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Environmental Management Systems (EMS) is very popular in the industrial sector, but the general belief is that EMS is something pertaining to industries only. Other parts of the world have started adopting compatible environmental management systems either voluntarily or for promoting standards by external certification.***
International environmental standards do not suit the existing Indian educational system. A very simple indigenized system has been devised to monitor the environmental performance of educational institutions. `experience Development of ownership, personal and social responsibility for the college and its environment Enhancement of college profile developing an environmental ethic and value systems in young people.
Keywords: Energy conservation, Energy management, solid waste management, sustainable development, Environment.

I. INTRODUCTION

A. General

The "Green Audit" is a process of reviewing and evaluating an organization's environmental performance and sustainability practices. The goal of a green audit is to identify areas where an organization can reduce its environmental impact, improve its resource efficiency, and ultimately reduce costs while also promoting environmentally responsible practices.

B. Relevance

Shri Venkateshwara Shikshan sanstha has started Nanasaheb Mahadik College of Engineering in the year 2011. The institute is approved by all India council for technical education (AICTE), new Delhi in and affiliated to Shivaji university, Kolhapur (3rd & 4th year) as well as 1st and 2nd year affiliated to dr. babasaheb ambedkar technological university, lonere, naka, and well connected by all modes of the transport (42 kms from sangli, 45 kms from Kolhapur and 25 kms from karad). Then in corporate campus is spread over an area of 11.32 acres in a serene and refreshing ambience, surrounded by greenery. The spacious campus contains main building, hostels for boy & girl, workshops with a built-up area of around 10000 sq. mt. canteen and garden.
During a green audit, a team of experts or auditors will conduct a comprehensive assessment of an organization's energy use, water consumption, waste management, and other environmental impacts. The auditors will then provide recommendations for improvements that can be made to reduce the organization's environmental footprint.

II. LITERATURE SURVEY

A. Prof. Subhash B.Magar (2015) "GREEN AUDIT A CASE OF ARTS, SCIENCE AND COMMERCE COLLEGE, MANMAD"

Green Audit is the most efficient & ecological way to solve such an environmental problem. The experiments on the nature by avoiding natural rules, this can be a one major reason behind green audit process. Green Audit is one kind of professional care which is the responsibility of each individual who are the part of economic, financial, social, environmental factor. The Green Audit of is Requirement of NACC Committee to the Junior college.

B. Bhandari H.S.et.al. (2021) "GREEN AUDIT AND GREEN CAMPUS: NEED OF THE HOUR"

NAAC accreditation is mandatory for all the higher learning institutes, particularly state universities. Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council. The general procedure described in the paper for Green auditing can be applied to conduct at any institution.

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III. OBJECTIVE

The proposed work has the following objectives:

1) To study the existing scenario of green auditing considering the limitation of an existing system.
2) To quantify the solid waste generation and management plans in the campus.
3) To provide energy consumption plan / alternative for college campus.
4) To study a green audit system on a college campus.

IV. RESERCH METHDOLOGY

1) Problem Identification
2) Study of literature related to green auditing scenario
3) Analysis of existing scenario
4) Identification of limitation in existing scenario

A. Statement

The methodology adopted to conduct the Green Audit of the Institution had the following components. The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The criteria, methods and recommendations used in the audit are based on the identified risks. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the document, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a three- step process comprising of data collection, data analysis and recommendation.

B. Data Collection

In preliminary data collection 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:
The team went to each department, Library, canteen, Hostel.
Data about the general information was collected by observation and interview.

C. Data Analysis

All this papers majorly discuss on green audit for an institutional campus in terms of Waste Management

1) Establishing a baseline of existing environmental conditions with focus on natural and physical environment.
2) Understanding the current practices of sustainability with regard to the use of water and green, generation of wastes, purchase of goods, transportation, etc.
3) Awareness generation among students concerning real issues and its sustainability.
4) To provide strategies and action plans towards improving green audit for future

V. DATA COLLECTION

A. Data of Solid Waste

Approximate quantity of waste generated per day (in kg):
College solid waste in offices refers to the non-hazardous waste generated in administrative offices within a college campus. It includes various types of waste materials produced during daily operations, such as paper, cardboard, food waste, plastic, electronic waste (e-waste), and other recyclable and non-recyclable items.

Office			
Biodegradable Waste	Non - Biodegradable	Hazardous	Others
1 Kg (appx.)	0.5(appx)	No	No

Table no. 1: Solid Waste of Office

College laboratories often generate various types of waste, including chemical waste, biological waste, and hazardous materials. Proper waste management in college laboratories is crucial to minimize environmental impact and ensure compliance with regulations. Here are some key considerations for waste management in college laboratories:

Laboratories			
Biodegradable	Non - Biodegradable	Hazardous	Others
2Kg(appx)	1(appx)	1Kg(appx)	No

Table no. 2: Solid Waste of Laboratories

Waste management in college canteens and kitchens is essential to minimize the environmental impact of food-related waste and promote sustainable practices. Here are some key considerations for waste management in college canteens and kitchens:

Canteen/kitchen			
Biodegradable	Non - Biodegradable	Hazardous	Others
1Kg(appx)	0.5Kg(appx)	0.5Kg(appx)	0.5(appx)

Table No. 3: Solid Waste of Canteen/kitchen

B. Solution For Solid Waste

To provide dustbins for a college, it is essential to consider the size, quantity, and strategic placement of the bins. Firstly, assess the number of students and the size of the college campus to determine the required quantity of dustbins. It's crucial to have enough bins to accommodate the waste generated by the college community.

Table No. 4: Provide Dustbin In College

PROVIDE DUSTBIN IN COLLEGE			
ITEM		NUMBER OF DUSTBIN	DUSTBIN CPACITY IN KG
Ground floor		4	2
First floor		4	2
Third floor		4	2
canteen	Dry	1	2
	Wet	1	4
hostel	Dry	1	3
	Wet	1	5

C. Energy Data

Energy consumption data in colleges typically refers to the information regarding the amount of energy, such as electricity and heat, used by the college campus or its facilities. This data is collected to monitor and analyze energy usage patterns, and implement strategies for energy conservation and sustainability. Some key points regarding the consumption of energy data in colleges are:

Electrical appliance	N0.s	Power(w) /unit	Total Power(w)	KW	Operate /day	KW/hrs.	No.of days in mont h	Total consumptio n per month (kW)
Tube	329	36	11,844	11.844	5	59.22	24	1,136.16
Fan	238	70	16,660	16.660	5	83.3	24	1,780.8
Bulb LED	20	14	280	0.280	5	1.4	24	33.6
LED Tube	20	20	400	0.400	5	2	24	48
Projector	6	282	1,692	1.692	1	1.692	24	40.608
Flood Light(LED)	14	50	700	0.700	1	0.70	30	21
Speakers	5	60	300	0.300	1	0.30	24	7.2
Computer	218	120	26,160	26.160	5	130.8	24	3,139.2
Laptop	15	65	975	0.975	5	4.875	24	117
Printer	15	40	600	0.600	1	0.60	24	14.4
Scanners	3	12	36	0.036	0.5	0.18	24	4.32
UPS	7	6	42	0.042	12	5.04	24	120.96
A/C	5	3,000	15,000	15.00	1	3	24	72
Refrigetar	4	460	1,840	1.840	24	44.16	24	1,059.84
Table Fan	2	70	140	0.14	2	0.28	24	6.72
Oven	2	1,000	2,000	2.00	2	4	24	96
Distillation Unit	1	2000	2000	2	1	2	12	24
Exhaust fan	7	70	490	0.490	5	2.45	24	58.8
TV	2	250	500	0.500	5	2.5	24	60
Total			89159W	89.159K W	86.5 hr	327.517KW/Hr		4771.608K W

Table No. 5: ENERGY DATA

VI. EXPERIMENTAL WORK

A. To Study of Basic Green Audit

This requires data collection and efforts for clarification of environmental policies. Green auditing includes systematic identification, recording and analysis of components related to sustainable development of an educational institution to preserve for future generations. The process has three important stages such as pre audit stage, audit stage and post audit stage.

B. To Study of Green Audit in NMCOE

Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus

1) Study Area

The selected site is situated are Shri Venkateshwara Shikshan Sanstha Nanasaheb Mahadik College of Engineering, Peth,Tal:Walawa, Dis:Sangli 415407. The college is located in about 11.32 acres of land. The spacious campus contains main building, hostels for boys and girls, workshop with a built-up area of around 10000sq.mtr.

Green audit forms part of a resource management process. Although they are individual events, the real value of green audit is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time.

Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency.

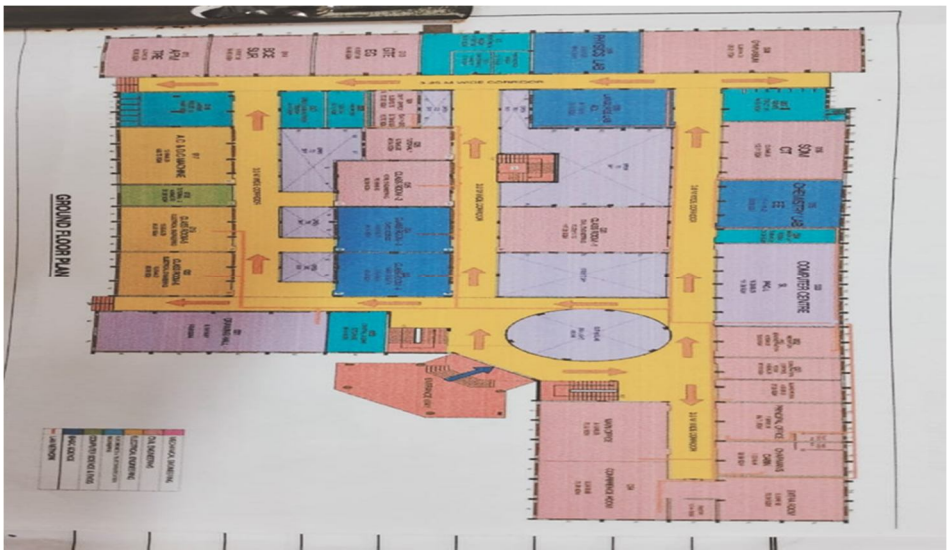


Fig. 6.1 College Building PLan

C. Electrical Solar

Under ideal condition:-

1 kW solar system can generate 4 units of electricity per day

Hence,

It is ideal for house hold that require approximately 100 – 120 unit per months.

Annual or year unit – 1440 units' electricity.

Solar panels produced electricity between 250 w and 400 w each.

In kWh – per day – produce – 2 kWh.

3 to 4 solar panels are needed to make up1 kilowatt.

1 unit of electricity = 1 kWh

1 kW = 1000 watt

Solar panel sizes:-

Inches (65 inches x 39 inches)

Feet (5.4 feet x 3.25 feet)

D. Calculation Of Solar Pannel

item	Nos	Watt	Total= no's x watt
Tube	329	36	11844
Fan	238	70	16660
Led tube	20	20	400
Tv	2	250	500
Table fan	2	70	140
		Total	14544 watt

Table No. 6: CALCULATION OF SOLAR PANNEL

Note: - Assume 16 kw/hr.

One day consumption = 16 kW x 7 hours = 112 kW

(Assume 7 hours college time)

Nos of panels
1 kW solar panel system generate 4 unit/day
112/4 = 28 kW
28000/320 = 88 panels
Assume 30 kW solar system for college.
One panel 320 watt system
30000/320 = 94 panels (suggestion)
Area of Solar Panel = Length x Breadth x Panel
Area of Solar Panel = 64 x 99 x 94 = 1526184 sq.cm (50072 sq. ft.)

E. Total Cost Calculation for Solar Panel

Sr. no.	Names	Numbers	Price in Rs.
1	Grid Inverter [DC to AC, 40 KW Capacity]	1	1,55,000
2	Energy Meter 3 Phase	1	1,800
3	Grid Energy Meter 3 Phase	1	12,000
4	Distribution Switch And MCB 64 Amp	10	7,200
5	Earthing Plate	5	500
6	Earthing Powder	100 Kg.	2,000
7	Lighting Arresters	1	500
8	Labor Charges	1	10,000
9	Cement Bags	2	640
10	Panel [320 Watt]	94	18,00,570
		Total	1,990,210 Rs.

Table No. 7: Total Cost Calculation

F. Break Evan Analysis

Total Cost = 20,000,000 Rs.
Daily Unit Uses = 120 Units
Daily Unit in Rs. = 120 x 15.50 = 1860 Rs. / Day (15.50 Rs. / unit)
Total Unit Cost per Year = Daily Unit in Rs. x (days) = 1860 x 365 = 678,900 Rs. / Year
Investment Return in Time Period (Years) = Total Investment Cost / Total Unit Cost Per Year = 20,000,000 / 678,900 = 2.94 Year = 3 Years



Fig.6.2 Canteen waste



Fig. 6.3 Main Building Waste



Fig. 6.4 solar panel

VII. CONCLUSION

Green Audit is the most efficient & ecological way to solve such an environmental problem. The experiments on the nature by avoiding natural rules, this can be a one major reason behind Green audit process. Green Audit is one kind of professional care which is the responsibility of each individual who are the part of economic, financial, social, environmental factor. The Green Audit of is Requirement of NACC Committee to the Engineering college. It is necessary to conduct a green audit in college campus because student aware of the green audit, its advantages to save the planet & they become good citizen of our country.

Thus Green audit Become necessary at the college.

1) The existing scenario of green auditing involves the evaluation and assessment of organizations' environmental performance and practices to ensure they are complying with relevant regulations and pursuing sustainable initiatives. Green auditing aims to identify areas where organizations can improve their environmental impact and provide recommendations for implementing more sustainable practices.

2) The findings of the solid waste audit reveal both challenges and opportunities for the audited organization. By quantifying and categorizing the types and quantities of waste generated, the audit has highlighted potential areas for waste reduction, reuse, and recycling. The report emphasizes the importance of implementing waste segregation systems, promoting responsible consumption practices, and exploring partnerships with recycling facilities and waste management service providers.

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3) In conclusion, the green audit report on energy audit has provided valuable insights and recommendations for promoting sustainability and optimizing energy consumption. Through a comprehensive analysis of energy usage patterns, this audit has shed light on areas where improvements can be made to reduce environmental impact and enhance operational efficiency. Identifying energy-intensive processes, equipment, and systems, the audit has highlighted potential areas for energy conservation and cost savings.

4) The report emphasizes the importance of implementing energy-efficient technologies and practices, such as upgrading equipment, optimizing workflows, and adopting renewable energy sources.

VIII. FUTURE SCOPE

The future scope of construction wetland systems is promising, as they continue to gain recognition and importance in various fields. Here are some potential areas where wetland systems can play a significant role:

A. Solid Waste Management Recommendations:

Future Plans:-

1) Increased Emphasis on Waste Reduction
2) Advanced Recycling Technologies
3) Organic Waste Management
4) Waste-to-Energy Technologies
5) Smart Waste Management Systems
6) Extended Producer Responsibility (EPR)
7) Public-Private Partnerships
8) Policy and Regulatory Frameworks
9) Education and Awareness.

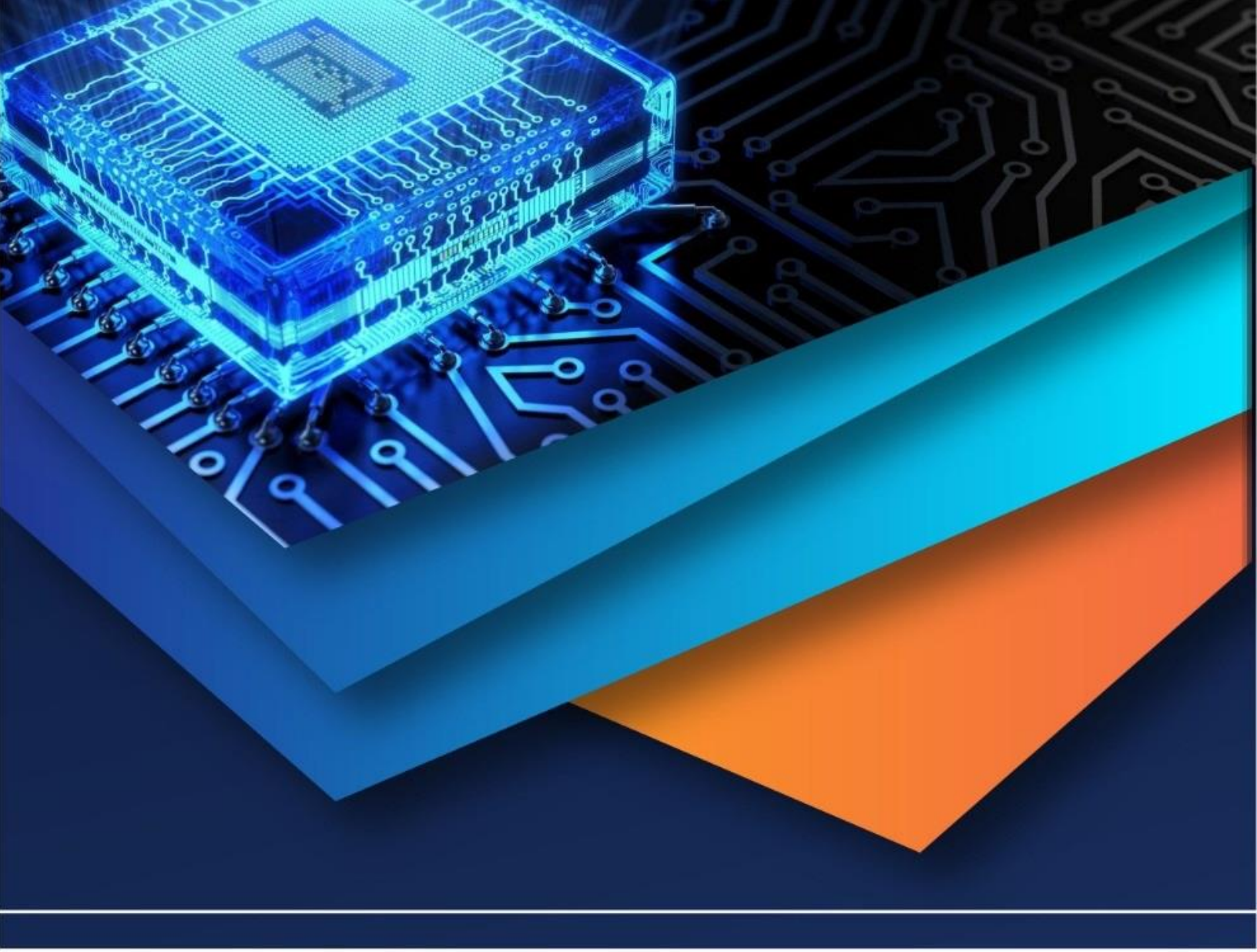
B. Energy Management Recommendations

Future Plans:-

1) Assemble a team for gather information
2) Perform energy audits
3) Analyze findings
4) Educate and engage the community.

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