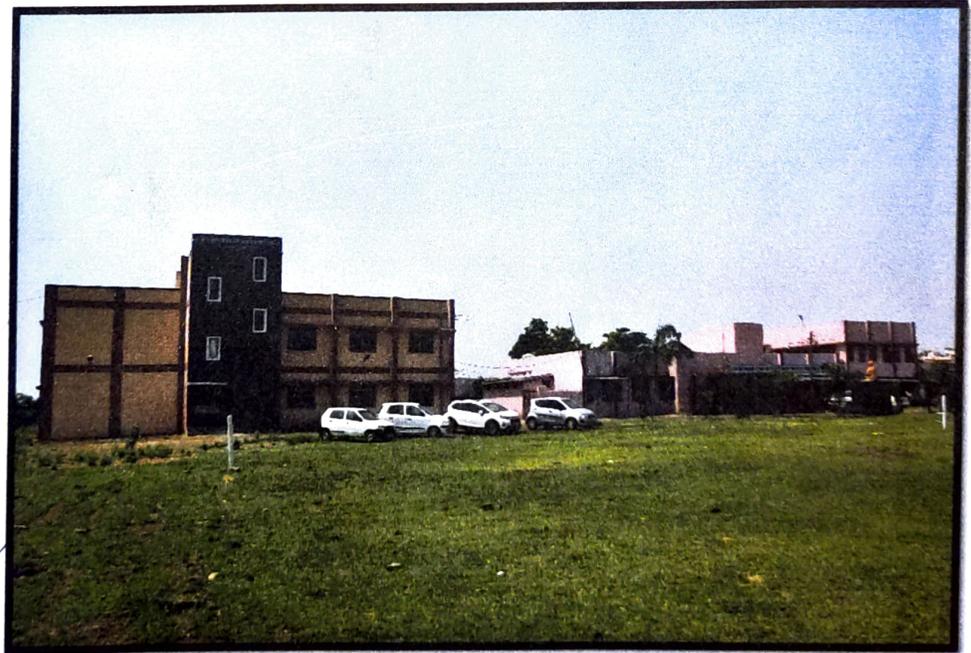




2021

GREEN & ENVIRONMENT AUDIT REPORT
**Indira Gandhi Government Post-
Graduation College, Vaishali Nagar-
Bhilai**



March 2021

Prepared By:

Greenserve Energy Management Solutions

Vijay Nagar,

Durg (C.G.) - 491001



Acknowledgement

We are thankful to the Management and the Principal of the Indira Gandhi Govt Post-Graduation College, Vaishali Nagar, Bhilai for entrusting processes of Green & Environment auditing with us. We thank all the participants of the auditing team especially students, faculty and non-teaching staff who took pain along with us to gather data through survey. We also thank the office staff who helped us during the document verification.

Audit Team Members

1	Ponraja N	Certified Energy Auditor
2	Rahul Agrawal	Certified Energy Auditor
3	Jayendra Mohabe	Senior Energy Engineer
4	Bhumes Jagnit	Energy Engineer

Handwritten signature of Rahul Agrawal and a circular stamp. The stamp contains the text: Certified Energy Auditor, EA-20984, BEE, and Rahul Agrawal.



1. Executive Summary

A nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. A clean and healthy environment aids effective learning and provides a conducive learning environment. Educational institutions now a day are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly. To preserve the environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc.

Green and Environment audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Green auditing and the implementation of mitigation measures is a win-win situation for all the college, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Green auditing promote financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers.

In Indira Gandhi Govt. Post-Graduation College, Vaishali Nagar, Bhilai the audit process involved initial interviews with management to clarify policies, activities, records and the cooperation of staff and students in the implementation of mitigation measures. This was followed by staff and student interviews, collection of data through the questionnaire, review of records, observation of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the green auditing process in the college.

The baseline data prepared for the college will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development of the college. Existing data will allow the college to compare its programmes and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects. We expect that the management will be committed to implement the green audit recommendations.

We are happy to submit this green & environment audit report to the Indira Gandhi Govt. Post-Graduation College, Vaishali Nagar, Bhilai authorities.



2. Introduction

Indira Gandhi Govt. Post-Graduation College, located in Vaishali Nagar, Bhilai Municipality in the Tehsil & District of Durg State Chhattisgarh, Established on 12th July 1989. With a campus spread across 10.61 acres, the college has a fine infrastructure, herbal and botanical gardens, a Big ground and other sports and games facilities.

VISION AND MISSION

Institutional Vision

Indira Gandhi Govt. Post-Graduation College seeks to become a centre of excellence by providing its students a comprehensive education with special emphasis on responsible citizenship, secular outlook, moral values and abiding faith in God expressed in active concern for others.

Mission

The college strives to become a seminal centre for the promotion of the all-round development of the students of this region, especially the women, socially marginalized and students those from a rural background who are economically disadvantaged.

Objectives of the College

The college endeavours to prepare its students for fulfilling careers by enabling them to realize their full potential and by inculcating in them the spirit of intellectual enquiry, independent thinking, self-reliance, leadership, cooperation, expression of cultural talents and social service.

Total Campus Area & College Building Spread Area

Campus area	10.61 Acre
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Location:

Indira Gandhi Govt. Post-Graduation College and the GPS Coordinates of the college is **21.22224, 81.36118.**





3.0 Pre-Audit Stage

A pre-audit meeting provided an opportunity to reinforce the scope and objectives of the audit and discussions were held on the practicalities associated with the audit. This meeting is an important prerequisite for the green audit because it is the first opportunity to meet the auditee and deal with any concerns. The meeting was an opportunity to gather information that the audit team can study before arriving on the site. The audit protocol and audit plan was handed over at this meeting and discussed in advance of the audit itself. In College pre-audit meeting was conducted successfully and necessary documents were collected directly from the college before the initiation of the audit processes. Actual planning of audit processes were discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the college management. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself. The audit team worked together, under the leadership of the lead auditor, to ensure completion within the brief and scope of the audit.

Management's Commitment

The Management of the college has shown the commitment towards the green auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly such as awareness programs on the environment, campus farming, planting more trees on the campus etc., after the green auditing. The management of the college was willing to formulate policies based on green auditing report.

Scope and Goals of Green & Environment Auditing

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. Green & Environment Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of Economical, financial, social, environmental factor. It is necessary to conduct green audit in college campus because students become aware of the green audit, its advantages to save the planet and they become good citizen of our country. Thus, Green audit becomes necessary at the college level. A very simple indigenized system has been devised to monitor the environmental performance of Indira Gandhi Govt. Post-Graduation College, Vaishali Nagar, Bhiali. It comes with a series of questions to be answered on a regular basis. This innovative scheme is user friendly and totally voluntary. The aim of this is to help the institution to set environmental examples for the community, and to educate the young learners.



Benefits of the Green & Environment Auditing

- More efficient resource management
- To provide basis for improved sustainability
- To create a green campus
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and managing Point out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental management approach and Improving environmental standards
- Benchmarking for environmental protection initiatives
- Financial savings through a reduction in resource use
- 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 youngsters.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the college.



Target Areas of Green and Environment Auditing

Green audit forms part of a resource management process. Although they are individual events, the real value of green audits 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.

All these indicators are assessed in process of "Green and Environment Auditing of educational institute". Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.

Auditing for Water Management

Water is a natural resource; all living matters depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. We need to use water wisely to ensure that drinkable water is available for all, now and in the future. A small drip from a leaky tap can waste more than 180 liters of water to a day; that is a lot of water to waste enough to flush the toilet eight times! Aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water. It is therefore essential that any environmentally responsible institution examine its water use practices.

Auditing for Energy Management

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent bulb uses approximately 60W to 100W while an energy efficient light emitting diode (LED) uses only less than 10 W. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.



Auditing for Waste Management

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals.

This indicator addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and petrol. Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse. Thus the minimization of solid waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices.

Auditing for Green Campus Management

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's delicate balance and our quality of life. Without this variability in the living world, ecological systems and functions would break down, with detrimental consequences for all forms of life, including human beings. Newly planted and existing trees decrease the amount of carbon dioxide in the atmosphere. 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 that a single tree produces is enough to provide one day's supply of oxygen for people. So while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering many students are under some amount of stress.

Auditing for Carbon Footprint

Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of fossil fuels (such as petrol). The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon



dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. An important aspect of doing an audit is to be able to measure your impact so that we can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method travelled between home and college every day. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards sustainable development. It is therefore essential that any environmentally responsible institution examines its carbon footprint.

Methodology of Green and Environment Auditing

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 were 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:

1. 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, centres, Library, canteen etc.
- Data about the general information was collected by observation and interview.
- The power consumption of appliances was recorded by taking an average value in some cases.

2. Data Analysis - Detailed analysis of data collected include: calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the Chhattisgarh State Electricity Board (CSEB). Data related to water usages were also analysed using appropriate methodology.

3. Recommendation – On the basis of results of data analysis and observations, some steps for reducing power and water Consumption were recommended. Proper treatments for waste were also suggested. Use of fossil fuels have to be reduced for the sake of community health. The above target areas particular to the college was evaluated through questionnaire circulated among the students for data collection. Five categories of questionnaires were distributed.



4.0 Post-Audit Stage

4.1 Energy Usage:

DETAILS OF OLD BUILDING ENERGY CONSUMPTION

Sl. No.	Location / Room No.	Energy Consumption kWh /Day
COLLEGE BUILDING		
1	Principal Chamber	16.83
2	Room No.-02	4.52
3	English Department	2.36
4	Mathematics Department	7.09
5	Room No.-05	3.68
6	Home Science	5.61
7	Room No.-07	1.49
8	Sports Room	1.06
9	Room No-09	1.60
10	Girls Common Room	0.53
11	Office	1.49
12	Room No-19	4.26
13	Room No-20	12.30
14	Room No-10(Physics Department)	6.36
15	Room No-14(Conference Hall)	5.59
16	Smart Class	5.27
17	Old NCC Room	0.90
18	Geography Room	1.68
19	Staff Room	2.54
20	Room No-18(Economics)	8.12
21	Computer Department	19.08
22	Class Room 1st Floor	4.26
23	1st Floor Passage	5.18
24	Commerce Department-01	3.82
25	Commerce Department-02	2.11
26	Store Room	2.28
27	Hall	6.83
28	Library	12.91
29	Ground Floor Passage	9.86
30	Outdoor Lighting	8.40
31	Chemistry Department(Room No-13)	10.57
32	Room No-12	3.89
33	Industrial Microbiology Department(Room No-11)	14.84
34	Room No-21	4.68
35	Room No-22	9.36
36	Room No-23(Zoology Department)	8.80
37	Room No-24	5.32
38	Wash Room Boys	0.60
39	Wash Room Girls	0.71
	Total Energy Consumption	120.0



4.1 Water Usage:

Water Storage Tank Capacity in Litre

Sl No.	Location	No.of Tank	Tank Capacity (Ltr)	Storage Capacity (Ltr)	Total Storage (Ltr)
1	College Building	3	1000	3000	5500
		2	750	1500	
2		2	500	1000	
Total Water Storage					5500

Water Supply to College in Litre/ Day

Sl No.	Source Of Water	kW Rating	Location	Under Control	Rated Flow (LPM)	Pump Running Minute /Day	Supply Ltr/Day	% age of Supply Water
1	Submersible Pump (2 HP)	1.5	College Building	College premises	500	20	3000	55
2	Motor Pump (1 HP)	1			250	20	2500	45
Total Water Supply							5500	

College Building water Consumption Litre / Day

Sl No.	Location	Qty. (Nos.)	No.of Tab	Water Cons. Ltr./Day	Water Cons.(%)	Water Outlet to	Remark
1	Room No-10	1	1	50	2.04	Ground	
2	Staff Room	1	4	200	8.16	Ground	
3	Chemistry Department	1	3	150	6.12	Ground	
4	R.O Filter	2	2	500	20.41	Ground	50% waste water
5	Room No-12	1	2	100	4.08	Ground	
6	Room No-24	1	3	150	6.12	Ground	
7	Room Cooler	12	12	300	12.24	NO	4 month use in a year
8	Water Cooler	2	2	100	4.08	NO	
9	Boys Toilet & Urinal	1	6	300	12.24	Shock Pit	
10	Girls Toilet & Urinal	1	6	300	12.24	Shock Pit	
11	Gardening		6	300	300.00	Ground	
Total water Consumption				2450	100.00		



Existing water management methods installed in the campus

Sl No.	Source of ground recharger	Total	Location	Quantity (No.)
1	Soak Pit	1	College Building	1

4.3 Waste measure and its disposal

MONTHLY PAPER DETAILS:

Sl No.	Details of Paper		New Paper	Waste Paper	
	Paper	Unit	New Paper	Waste Paper	News & Other Paper
1	Paper Packet (A4 Size)	No.	5	2	NA
2	Weight Per Packet (Kg)	Kg / Packet	2.20	2.20	NA
3	Total Weight	Kg	11	4.4	NA
				4.4	

Existing waste management methods practiced

- Cleaning the campus on daily basis.
- Segregation of waste into degradable and non-degradable by the cleaning staff.
- Waste bin's in placed in corridors, office and staff rooms.
- E-waste and plastic waste disposal at municipal collection center.
- Campaigns for reduce, reuse and recycle.
- Special arrangement for exist of waste water from chemical lab.

4.4 Greenery in Campus

Campus tree cover – 0.5 Acre (Approx)



Existing trees details in the campus

Sr. No.	English Name/Scientific Name	Common Name of Tree	Nos
1	Almond	Badam Tree	2
2	Eucalyptus	Neelgiri Tree	10
3	Banyan	Bargad Tree	6
4	Teak	Sagwan Tree	20
5	Custard Apple	Shitaphal Tree	5
6	Saraca asoca	Ashoka Tree	15
7	Musa	Banana Tree	5
8	Leucaena Leucocephala	Subabul	5
9	Hyophorbe lagenicaulis	Bottle Palm Tree	12
10	Indian Jujube	Ber Tree	3
11	Guava Tree	Jam tree	2
12	Vechillia Nilotica	Babul Tree	40
Total No. of trees			125



5.0 Conclusion and Recommendations

Green and Environment Audit is the most efficient way to identify the strength and weakness of environmental sustainable practices and to find a way to solve problem. Green Audit is one kind of professional approach towards a responsible way in utilizing economic, financial, social and environmental resources. Green audits can "add value" to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks (known and unknown). There is scope for further improvement, particularly in relation to waste, energy and water management. The college in recent years consider the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the college does perform fairly well, the recommendations in this report highlight many ways in which the college can work to improve its actions and become a more sustainable institution.

Major Audit Observations

- i) Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
- ii) Programs on green initiatives have to be increased. Campus is declared plastic free, stringent actions should be taken to maintain this.
- iii) Existing Rain water harvesting systems, solar power generation, environmental education programs have to be strengthened.
- iv) Display boards against the misuse of water use are lacking.
- v) Display boards for awareness in relation to energy conservation is found inadequate.
- vi) There are fans of older generation and non energy efficient which can be phase out by replacing with new energy efficient fans.
- vii) Solid waste management systems established are insufficient.
- viii) Waste bins in the class rooms, veranda, canteen and campus are inadequate.
- ix) Regular planting of trees in the campus Can be increased.
- x) Display boards to all plants & trees identified, Should be increased.
- xi) There is only very few fruit trees in the college to attract birds.
- xii) College has not yet taken any initiative for carbon accounting.



Recommendations:

Water

- i. Remove damaged taps and install sensitive taps is possible.
- ii. Awareness programs on water conservation to be conducted.
- iii. Install display boards to control over exploitation of water.

Environment

- i. Arrange training programmes on environmental management system and nature conservation.
- ii. Declare the campus plastic free and implement it thoroughly.

Energy

- i. Installation of Solar panels to generate electricity.
- ii. Establish a purchase policy that is energy saving and eco-friendly.
- iii. Replace incandescent and CFL lamps with LED lights.
- iii. Conduct seminars, workshops and exhibitions on environmental education.
- iv. Establish water, energy and waste management systems.
- v. Increase the number of display boards on environmental awareness such as – save water, save electricity, no wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.
- vi. Replace old fans with energy efficient fans.

Waste

- i. Conduct exhibition of recyclable waste products.
- ii. Conduct more seminars and group discussions on environmental education.
- iii. Remove damaged taps and install sensitive taps is possible.
- iv. Practice of waste segregation to be initiated.
- v. Avoid plastic/thermocool plates and cups in the college level or department level functions.
- vi. Establish an E-waste collection center in campus.



Green Campus

- i. All trees in the campus should be named scientifically.
- ii. Create more space for planting.
- iii. Grow potted plants at both verandah and class rooms.
- iv. Create automatic drip irrigation system during summer holidays.
- v. Not just celebrating environment day but making it a daily habit.
- vi. Beautify the college building with more indoor plants.
- vii. Conducting competitions among departments for making students more interested in making the campus green.

Carbon footprint

- i. Establish a system of car pooling among the staff to reduce the number of four wheelers coming to the college.
- ii. Encourage students and staff to use cycles.

Commitments after Green and Environment Auditing

In the light of green and environment audit the College should, adopt some additions in the vision and mission statements promoting compliance with environmental laws and regulations for sustainable existence of the college.



CERTIFICATION

This Part shall indicate certification by Certified Energy Auditor stating that:

- I. The data collection has been carried out diligently and truthfully.
- II. All data monitoring devices are in good working condition and have been calibrated or certified by approved agencies authorized and no tampering of such device has occurred.
- III. All reasonable professional skill, care and diligence had been taken in preparing the Green & Environment Audit Report and the contents thereof are a true representation of the facts.
- IV. Adequate training provided to personnel involved in daily operation after implementation of recommendation.

Signature:



Name of the Certified Energy Auditor: Mr. Rahul Agrawal
Certification Detail: EA-20984


Principal
Indira Gandhi Govt. P.G. College
Vaishali Nagar, Bhitai