



MAHILA VIKAS SANSTHA, WARDHA

**INDRAPRASTHA NEW ARTS, COMMERCE AND SCIENCE
COLLEGE WARDHA DIST 442001(M.S)**

(Affiliated to RTM Nagpur University)
www.nacscwardha.org

7.1.3_c

Quality audits on environment and energy regularly undertaken by the Institution. The institutional environment and energy initiatives are confirmed through the following

- 1.Green audit / Environment audit***
- 2.Energy audit***
- 3.Clean and green campus initiatives***
- 4.Beyond the campus environmental promotion activities***

REPORTS



Mahila Vikas Sanstha's

INDRAPRASTHA NEW ARTS COMMERCE & SCIENCE COLLEGE, AT POST NALWADI, DIST. WARDHA (M.S.)

Accredited 'B' by NAAC

Approved by government
of Maharashtra

Affiliated to Rashtrasant Tukadoji
Maharaj Nagpur University, Nagpur

Recognised by U.G.C New Delhi
under section 2 (f) & 12 (b) of
UGC act 1956

Date:19/04/2024

DECLARATION

This is to declare that the information, reports, true copies and numerical data etc. furnished in this file as supporting documents is verified by IQAC and found correct. Hence this certificate.

IQAC

S. S. C. Pelate
Coordinator

Internal Quality Assurance Cell
Indraprastha New Arts Commerce
and Science College, Wardha



Principal

[Signature]
PRINCIPAL
Indraprastha New Arts, Commerce
& Science College, WARDHA.

Tel: +91 7152-253093, 240152 Fax: +91 7152-240152 | www.nacscwardha.org



Mahila Vikas Sanstha's

**INDRAPRASTHA NEW ARTS
COMMERCE & SCIENCE
COLLEGE,** AT POST NALWADI, DIST. WARDHA (M.S.)

Accredited 'B' by NAAC

Approved by government
of Maharashtra

Affiliated to Rashtrasant Tukadoji
Maharaj Nagpur University, Nagpur

Recognised by U.G.C New Delhi
under section 2 (f) & 12 (b) of
UGC act 1956

GREEN CAMPUS/PLASTIC-FREE CAMPUS POLICY

Introduction

This policy document establishes the commitment of Indraprastha New Arts Commerce and Science College Nalwadi, Wardha to fostering a sustainable environment by implementing a Green Campus/Plastic-Free initiative. The initiative is aimed at minimizing the environmental impact of campus operations and promoting sustainability among students, faculty, staff, and the community.

Objective

The primary objective of this policy is to transition Indraprastha New Arts Commerce and Science College Nalwadi, Wardha towards a more sustainable and environmentally friendly campus by:

- Reducing and eventually eliminating the use of single-use plastics on campus.
- Enhancing environmental awareness and education within the college community.
- Implementing sustainable practices in all aspects of campus operations.



Scope

This policy applies to all individuals on campus, including students, faculty, staff, contractors, and visitors.

Policy Details

☞ Plastic Reduction Strategies

- **Ban on Single-Use Plastics:** The sale and use of single-use plastic items (e.g., water bottles, straws, cutlery, and bags) are prohibited on campus premises. Alternatives made from biodegradable materials will be provided.
- **Sustainable Procurement:** All procurement processes will prioritize products and services that adhere to environmental sustainability standards, including packaging requirements that minimize plastic use.

☞ Waste Management

- **Recycling Programs:** Implement comprehensive recycling programs to manage waste effectively. This includes designated recycling bins for plastic, paper, metal, and glass.
- **Composting:** Facilitate organic waste composting programs for food waste generated from campus cafeterias and events.

☞ Energy and Water Conservation

- **Energy Efficiency:** Promote the use of energy-efficient appliances and lighting. Encourage initiatives such as the use of solar panels.



- **Water Conservation:** Implement measures to reduce water wastage, including the installation of low-flow fixtures and the maintenance of landscaping that requires minimal water use.

☞ **Education and Awareness**

- **Workshops and Seminars:** Regular workshops, seminars, and campaigns will be held to educate the campus community about sustainability practices and the importance of reducing plastic use.
- **Integration into Curriculum:** Environmental sustainability topics will be integrated into relevant courses to educate students about the impact and management of plastic waste.

☞ **Monitoring and Compliance**

- **Sustainability Committee:** Establish a Sustainability Committee responsible for implementing, monitoring, and reviewing the policy's effectiveness. This committee will consist of members from the administration, faculty, and student body.
- **Regular Audits:** Conduct annual audits to assess compliance with the policy and its impact on reducing plastic usage on campus.
- **Feedback and Improvement:** Encourage feedback from the college community to continually improve sustainability initiatives.

☞ **Conclusion**

Through the implementation of this Green Campus/Plastic-Free Campus policy, Indraprastha New Arts Commerce and Science College, Nalwadi



Wardha aims to demonstrate leadership in environmental stewardship and foster a sustainable future, aligning with global environmental standards and commitments.



S. S. Patil
Coordinator
Internal Quality Assurance Cell
Indraprastha New Arts, Commerce
and Science College, Wardha



GREEN AUDIT COMMITTEE

NAME	DESIGNATION
Dr. Ashish B. Sasankar	Chairman
Dr. Vaibhavi Ughade	Member
Mr. Sandip Petare	Member
Dr. Madan Ingle	Member
Dr. C. M. Wadatkar	Expert Member
Mr. Vaibhav Ughade	Expert Member

Auditing is an evaluating system of college in terms of internal controls for achieving goals. Planning, on-site work, audit report preparation, and follow-up are the most essential stages of the auditing process. College, in addition to imparting education is committed to environmental protection by reducing environmental impacts such as reducing waste, water and energy consumption. The basic motive is to inspect ongoing processes in college whose exercises can be harmful to the health of students, all workforce and environment. Our intention is to achieve environmental sustainability by implementation of better environmental sound practices.

Planning of preparation of Green Audit involves comprehensive steps of observation and verification by on-site visit. Planning process started with a discussion among committee members, the objectives were framed, the methodology followed by sampling and final report preparation ended with a number of initiatives to be undertaken for environmental sustainability through Vasundhara Nagar Katta



Objectives:

Objectives are significant to enhance our vision which further converts in the measurement of environmental components for achieving goals. Earth's natural resources are important to support life, but its overexploitation can lead to disturbance of the natural balance. In present time, conventional auditing supported by Green Auditing may assist the college to manage environmental resources by effective environmental mitigation measures. The following objectives are systematic attempt to reach at a target which could guide us for safe and clean environment for all.

1. To observe land use for various purposes.
2. To record and document Floral and faunal diversity in the college premises.
3. To prepare an air quality observation report.
4. To analyze water samples for aesthetic parameters.
5. To record noise level in the college premises and outside area.
6. To study soil quality of the college campus.
8. To prepare report on E-waste disposal and management.
9. To study solid waste management practices in college campus.
10. To study electrical power consumption in college.



S. S. Petare
Coordinator
Internal Quality Assurance Cell
Indraprastha New Arts, Commerce
and Science College, Wardha

[Signature]
PRINCIPAL
Indraprastha New Arts, Commerce
& Science College, WARDHA.



**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



**GREEN AUDIT REPORT
CONSULTATION REPORT**



**Indraprastha New Arts, Commerce and Science
College, Nalwadi, Wardha (M.H) 442001**

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

Flat No. 201, Om Apartment, 214 Indrapuri Colony,
Bhawarkuwa, Indore – 452 001 (M. P.), India

0731-4948831, 7869327256

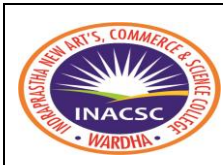
Email ID: eempirical18@gmail.com

www.eeplgroups.com

(2021-22)

CONTENTS

Sr. No.	Items	Page No
I	ACKNOWLEDGEMENT	3
II	EXECUTIVE SUMMARY	4
Chapter-1	Introduction	5
1.1	About College	5
1.2	About College Campus	8
1.3	Green Monitoring Committee	10
1.4	Green Audit Team	10
1.5	About Green Auditing	11
1.6	Objectives of Green Auditing	11
Chapter- 2	GREEN CAMPUS	12
2.1	Green Audit	12
2.2	Green campus Photograph	13
Chapter- 3	GREEN ENERGY AND SUSTAINABLE DEVELOPMENT	14
3.1	Grid Connected Solar Photovoltaic System	14
Chapter- 4	CARBON FOOT PRINT	15
4.1	About carbon foot print.	15
4,2	Methodology and Scope	16
4.3	Carbon emission from electricity	16
4.4	Other Emissions Excluded	17
Chapter- 5	WASTE MANAGEMENT	18
5.1	About Waste	18
5.2	Waste management Practices adopted by the College	19
Chapter- 6	RECOMMENDATIONS AND SUGGESTIONS	21
6.1	QR Code System	21
6.2	Other Suggestions	22



**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the management of **Indraprastha New Arts, Commerce and Science College, Nalwadi, Wardha (M.H)** for giving us an opportunity to conduct green audit for the college.

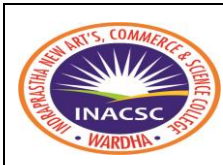
We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation the course of study.



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)
Chartered Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]



EXECUTIVE SUMMARY

Green Initiative Taken by College

✚ CAMPAIGN OF PLANTATION AND GREEN CAMPUS:

- ✚ College has around **280** trees in the campus. Its good initiative taken by management for green campus under the campaign of plantation. **It's APPRECIABLE.**

RECOMMENDATION: -

✚ 5 DUST BIN WASTE MANAGEMENT SYSTEM:

- It was observed that college has applied 5 dust bin system for waste management in campus. Waste management system help to implement 3R concept (Recovery, Reuse and Recycling) of different type of waste generated in the college campus.

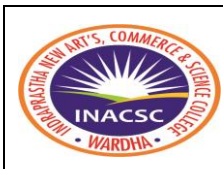
✚ QR Code System on Tree:

- While the world seems to be going digital, people lack the time to read books and process the information they contain. Hence, college can be provided QR codes on the trees for its information and to exploit the rapidly growing platform for a unique purpose.

✚ Eco-restoration programmes

- Frame a holistic campus development plan with long-term eco-restoration programmes for replacing exotic acacia plantations with indigenous trees.





**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



**CHAPTER-1
INTRODUCTION**

1.1 About College

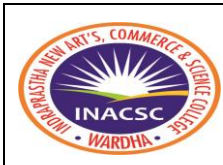
Over the last three decades Dr R.G Bhoyar's Group of Institutions has set an exalted example in the field of education, reaching beyond borders of knowledge. New Arts, Commerce and Science College, Wardha is one among many in this group. Founded by Dr Rajesh Bhoyar, an eminent intellect and philanthropist, in the year 1990, New Arts, Commerce and Science College has inspired students across India. He has established this College at Wardha making the ideals of Mahatma Gandhi as holistic foundation to it. Here the system of teaching is more of learners' oriented. A practical approach to the methods of teaching is being followed to prepare the students, face the challenges of life boldly.

This group strongly believes in imparting and propagating knowledge & live skills in core and frontier areas of all major fields of Science, Arts, Commerce and Management through innovative educational programs. The students are developed into a new group of professionals with an exceptional competence and a deep sense of values for life and commitment towards their responsibilities both for profession and nation as well. Here the students are not just taught but mentored, they are not just forced after the academics but guided to achieve success.

The major asset of NACSC is its staff members who are well qualified and hardworking. They are well committed in discharging their responsibilities. The faculty members are not just teachers but they are mentors. They guide their students in every possible aspect of their academics and help them to move on successfully.

Being a visionary scholar the Chairman Dr.R. G Bhoyar believed that educational institutions are the epicentres of knowledge. They should transform the unpolished and uncut stones into sparkling gems. He initiated variant number of educational programs like, Diploma, Bachelors and Master Levels in Humanities, Commerce, Science, Biotechnology, Computer Science/IT, Management, Social Work, Pharmacy and Vocational Education at NACSC.

With distinct uniqueness Dr R.G Bhoyar Group of Institutions stands like an example among all educational institutions in Vidarbha region.



**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



Vision:

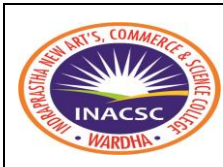
Our vision is to generate and propagate education through harmonious fusion of practical knowledge with values of life. We aim to develop our institution into an outstanding centre to provide quality education by effective Teaching and Learning programs. We are also committed to cater to the needs of rural as well as urban students with our progressive endeavor to enhance their skills and capabilities to face global market.

Mission:

To cater to the needs of rural, socially & economically backward students and make them self-reliant in all aspects of life

- To propagate, provide and preserve knowledge
- To cater to the needs of rural, socially & economically backward students and make them self-reliant in all aspects of life
- To acquire excellence in teaching methods
- To empower girl students in exalted way so that they can be self-determined to achieve goals of life and create their identity in the society
- To meet regional needs, community development programs are conducted regularly through various extension activities
- To cultivate & incorporate values and develop a responsible and productive citizen of nation
- To expand developmental opportunities available to all students and faculty as well
- To build alliances from academicians of various universities to enhance and upgrade the knowledge of students & faculty as well
- To provide practical and skill-based training for self-employment
- To promote and develop use of ICT learning by considering global challenges
- To develop exciting research environment
- To undertake multiple extension activities to reflect aims and objectives of our Institution





**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



Objectives:

- The basic motto of the college is "Nothing is sacred as knowledge in this world" and with this motive, the college has set following Objectives-
- To establish centre of higher education offering undergraduate and post graduate courses to serve rural society.
- Community development through various extension activities.
- To provide practice and skill-based knowledge to students for creating self-employment and employment opportunities in private and public sectors.
- To promote the use of ict in teaching, learning, research and evaluation.
- To undertake continuous assessment of students.
- To develop research attitude among students and teachers to cater to the local and global needs.
- To create environmental awareness to save and conserve nature
- To develop scientific temperament among students and teachers.
- To promote nationalistic ideals and values among students and teachers.



1.2 About College Campus:

Name of Teaching Department

- Department of Languages
- Department of Humanities
- Department of Sociology
- Department of Political Science
- Department of Home Economics
- Department Of Commerce and Management
- Department Of Biotechnology
- Department Of Computer Science
- Department Of Chemistry
- Department Of Physics
- Department Of Mathematics
- Department Of Social Work

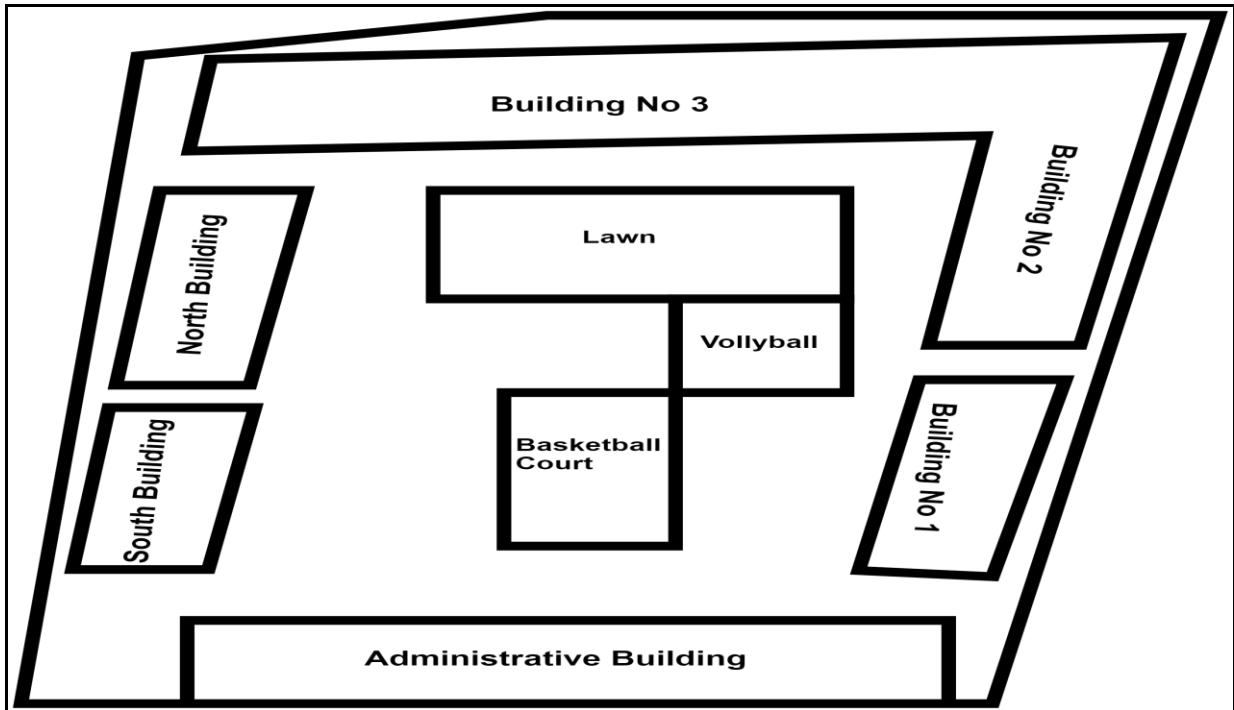




**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**

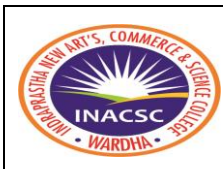


College Building Layout: -



Satellite image of college: -





**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



1.3 Energy Monitoring Committee.

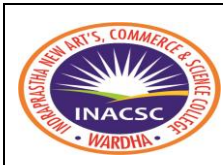
Sr.No	Name of Member	Designation	Designation
1	Mr. Sandip S. Petare	Assistant Professor	Coordinator & Botanist
2	Prof. Vaibhavi Ughade	Assistant Professor	Member
3	Shri. Sagar Bansod	RFO, Wardha (M.S)	Member
4	Dr. C.M Wadatkar	Botanist	Member
5	Dr. Madan Ingle	Director Physical Education	Member
6	Mr. Pramod Tadas	Librarian	Member
7	Dr. Suraj Deshmukh	Assistant Professor	Member
8	Mr. Pankaj Dengele	Student	Member
9	Miss. Gauri Mule	Student	Member

1. 4 Audit Team

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

- ✚ **Mr. Rakesh Pathak,** [Director]
- ✚ **Dr. Suresh Soni** [Reviewer]
- ✚ **Mrs. Laxmi Raikwar Singadiya,**[Energy Engineer]
- ✚ **Mr. Sachin Kumawat** [Project Engineer]
- ✚ **Mr. Ajay Nahra,** [Site Engineer]





Green Audit Report of New Indraprastha New Arts Commerce and Science College, Nalwadi, Wardha (M.H) Year 2021-22



1.5 About Green Auditing

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

Green audit means to identify opportunities to sustainable development practices, enhance environmental quality, improve health, hygiene and safety, reduce liabilities achieve values of virtue. 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.

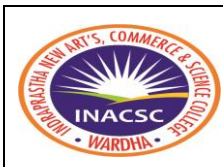
Green auditing of “**Indraprastha New Arts, Commerce and Science College, Nalwadi, Wardha (M.H)**” enables to assess the life style, action and its impact on the environment. This green audit was mainly focused on greening indicators like utilisation of green energy (solar energy) and optimum use of secondary energy sources (petrol and diesel) in the college campus, vegetation, and carbon foot print of the campus etc. The aim of green auditing is to help the institution to apply sustainable development practices and to set examples before the community and young learners.

1.6 Objectives of Green Auditing

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

The specific objectives are:

- ✚ To suggest measures to make the college campus biodiversity rich
- ✚ To demarcate areas within the institute campus which have potential for restoration of green campus.
- ✚ To make recommendations for the conservation, protection and rejuvenation of the natural vegetation and animal life by involving students and faculty members
- ✚ To inculcate values of sustainable development practices through green audit mechanism.
- ✚ Providing a database for corrective actions and future plans.
- ✚ To identify the gap areas and suggest recommendations to improve the green campus status of the college



**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



**CHAPTER- 2
GREEN CAMPUS**

2.1 Green Audit

In the survey, focus has been given on assessment of present status of diversity in form of plants, in college campus and efforts made by the college authorities for nature conservation. Campus is located in the vicinity of approximately more than 280 trees/ medicinal herbs/ ornamental plants. The detail is given below:

Table: - List of plants in college campus

Sr. No	Plant Name	Scientific Name	Family	Quantity (no)
1	Mango	Mangifera indica	Anacardiaceae	08
2	Gulmohar	Delonix regia	Royal poinciana	08
3	Ashoka	Roystonea regia	Fabaceae	10
4	Kaner	Nerium indicum	Apocynaceae	10
5	Pomegranate	Punica granatum	Lythraceae	02
6	Rose	Rose	Rosaceae	20
7	Lemon	Citrus limon	Rutaceae	02
8	Curry Leaf	Murraya koenigii	Rutaceae	10
9	Neem	Azadirachta indica	Meliaceae	35
10	Asoka	Saraca asoca	Caesalpinioideae	42
11	Jamun	Syzygium cumini	Myrtaceae	02
12	Seetaphal	Annona squamosa	Annonaceae	03
13	Rubber Plant	Ficus elastica	Moraceae	01
14	Amaltas	Cassia fistula	Fabaceae	16
15	Hibiscus	Hibiscus rosa-sinensis	Malvaceae	15
16	Kanher	Carrissa carandas	Apocynaceae	02
17	Amla	Citrus officinalis	Lamiaceae	03
18	Peru	Psidium guajava	Myrtaceae	02
19	Umbar	Ficus racemose	Moraceae	01
20	Drum stick	Moringa oliefera	Moringaceae	14
21	Mayur Pankhi	Platycladus orientalis	Cupressaceae	32
22	Kasta	Senna alexadrina (Senna)	Fabaceae	03
23	Tecoma	Tecoma stans	Bignoniaceae	30
24	Fabaceae	Acacia concinna	Fabaceae	05
25	Bel	Aegel marmelos	Rutaceae	02
27	Lemon	Citrus lemon	Rutaceae	02
		Total		280



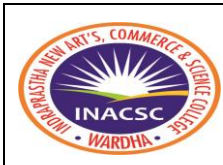
**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



2. 2 Some Photograph of Green campus: -



College has **280** trees in the campus. This is good initiative taken by management for green campus under the campaign of plantation. **It's APPRECIABLE.**



**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



**CHAPTER- 3
SOLAR PHOTOVOLTAIC SYSTEM**

3.1 Photovoltaic System (8.96 Kwp)

There is 8.96 KWp solar photovoltaic roof systems installed on college building in 2017.

System details are given below:

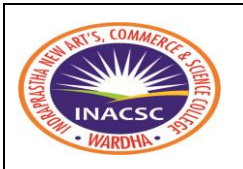
Table: - Solar system details given in table: -

Sr. No	Description	Technical Specification
1	Plant Information	
1.1	Plant capacity	8.96 KWp
1.2	Location	College Terrace
1.3	Latitude & Longitude	77.47 E°& 23.17 N°
2	PV Panel Details	
2.1	Make	WAAREE
2.2	Panel Type	Multi-Crystalline
2.3	Panel Wattage	320 Watt
2.4	Panel Tilt Angle	23°
2.5	Total Penal	28
3	Inverter Information	
3.1	Make	GROWATT
3.2	Model	A1Z371104A
3.3	Capacity of Inverter	10 KW
3.4	No of Inverter	1



Figure: Solar Plant 8.90 KWp and Inverter System

Observation: - It is observed that there is no any energy meter to solar generation system.



Chapter-04 Carbon Foot print

4.1 About carbon foot print.

Climate change is one of the greatest challenges facing nations, governments, institutions, business and mankind today.

Carbon footprint is a measure of the impact your activities have on the amount of carbon dioxide (CO₂) produced through the burning of fossil fuels and is expressed as a weight of CO₂ 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 use 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 behaviour.

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...





**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



4.2 Methodology and Scope

The carbon footprint gives a general overview of the College greenhouse gas emissions, converted into CO₂ -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 College 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 the College. This includes electricity, as well as emission 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 in order to produce an average kilowatt-hour within that grid region

Unlike with 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 the significant contributors towards GHGs emission 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 of generating electricity, carbon dioxide intensity of electricity for national grid is assumed to be 0.9613 KgCO₂/Kwh



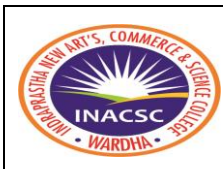
(Reference: Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/database_11.zip) Electricity Purchased from the grid

Sr. No	Parameter	Unit	Value	Emission Factor kg CO2e/kWh	Emission ton CO2e/year
1	Electricity	13,215	kWh	0.9613	12.70

4.4 Other Emissions Excluded

This study did not evaluate the carbon sequestration potential of existing plantation activities and emission 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 emission in the future years. Accordingly, a set of tools and record keeping procedure will be developed for improving the quality of data collection for the next year carbon footprint studies.





**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



**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 to public health. Waste management is important for an eco-friendly campus. In college different types of wastes are generated, its collection and management are very challenging.

Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. A bio-degradable waste includes food wastes, 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 in the college. 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 college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

Different types of waste generated in the College Campus.

Sr. No.	Types of Waste	Particulars
1	Solid wastes	Damaged furniture, paper waste, paper plates, food wastes 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 College

College has a different type of waste generated like paper, Plastic, dust and wet waste. The college provided small dustbin to every classroom, office, laboratories, staff room, ladies common room etc. and collect the waste material at the end of the day. The waste (Especially dry material) is collected in a big dustbin which are provided at every floor and the next day collected municipal corporation for further processing.

wet waste generated in home economics laboratory as well as waste from agriculture (Tree and plants waste) used in vermicompost unit is one of the best tools to decompose wet waste by earthworm. It will provide several social economics of environmental benefits to the society by way of producing chemical free. safe nutritive and healthy protective (rich in minerals and antioxidants) food for people.

Vermicompost is a sustainable tool for environment, equilibria vermicompost significantly affect the plant growth and hence vermicompost generated from this unit is used in botanical garden and ornamental garden as additional food.

Sr. No	Name of Building	Type of waste	Type of Colour	Quantity (no)
1	Admin Building	Dry Waste	Blue and Green	10
2	Wing A	Dry Waste, Liquid Waste	Blue and Green	22
3	Wing B	Dry Waste	Blue and Green	18
4	In Campus	Dry Waste	White	01





Recommendation:

Adopted 5 Bin Waste Collection System for collect different type of waste generated in college premises.



Figure: 5 Dust Bin waste collection System



CHAPTER- 6 RECOMMENDATIONS AND SUGGESTIONS

6.1 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, College can be provided QR codes on the trees for its information and to exploit the rapidly growing platform for a unique purpose.



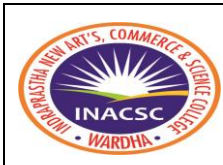
Figure: - QR Code System for plants

These codes can give students all the information they need to know about the tree — from its scientific name to its medicinal value. They only need to put their smart-phones to use. QR codes to them, making it easier for everybody to learn about a plant or a tree at the tip of their fingers,” If any app generating a QR code, which is available for free on the online stores, can be used to avail the information of the trees.

Eco-restoration programmes

- Frame long-term eco-restoration programmes for replacing exotic Acacia plantations with indigenous trees and need of the hour is to frame a holistic campus development plan.





**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**

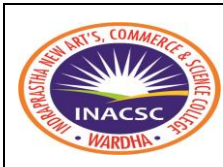


6.2 Other Suggestions

Some of the very important suggestions are: -

- ✚ Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.
- ✚ Increase recycling education on campus.
- ✚ Increase Awareness of Environmentally Sustainable Development in college campus.
- ✚ Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.
- ✚ Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development.
- ✚ Collaborate for Interdisciplinary Approaches- To develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- ✚ Increase reduces, reuse, and recycle education on campus.
- ✚ Develop a butterfly garden that arouses appreciation towards flora and fauna diversity.
- ✚ Name all the trees and plants (Plant DNA barcodes) with its common name and scientific name.
- ✚ Arrange training programmes on environmental management system and nature conservation.
- ✚ Renovation of cooking system in the canteen to save gas by installation solar water heater system with heat pump.
- ✚ Establish a procurement policy that is energy saving and eco-friendly.





**Green Audit Report of New
Indraprastha New Arts Commerce and
Science College, Nalwadi, Wardha (M.H)
Year 2021-22**



END OF THE REPORT



**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



**ENVIRONMENT AUDIT REPORT
CONSULTATION REPORT**



**Indraprastha New Arts, Commerce and Science
College, Nalwadi, Wardha (M.H) 442001**

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

Flat No. 201, Om Apartment, 214 Indrapuri Colony,
Bhawarkuwa, Indore – 452 001 (M. P.), India

0731-4948831, 7869327256

Email ID: eempirical18@gmail.com

www.eeplgroups.com

(2021-22)



**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



CONTENT

Sr. No.	Items	Page No
I	ACKNOWLEDGEMENT	3
II	EXECUTIVE SUMMARY	4
Chapter-1	Introduction	6
1.1	About College	6
1.2	About College Campus	9
1.3	Environmental Monitoring Committee	11
1.4	The Audit Team	11
1.5	About Water Auditing	12
1.6	Objective of water Audit	12
1.7	Target area of water audit	12
1.8	Methodology Followed for conducting water Audit	13
Chapter- 2	Water Consumption and waste water sources	14
2.1	Details of source fresh water and uses area	14
2.2	Water Accounting and metering system	14
2.3	Water Storage Capacity in College campus	15
2.4	Water uses area in College Campus	16
2.5	Fresh Water uses for Gardening	16
2.6	Waste water generation sources of college campus	17
Chapter- 3	Rain Water Harvesting System	18
3.1	About rain water harvesting	18
3.2	Estimated Rain water harvesting Potential of the College	19





**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the management of **Indraprastha New Arts, Commerce and Science College, Nalwada, Wardha (M.H).** for giving us an opportunity to conduct Environment audit for the college.

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 the course of 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)
Chartered Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]



EXECUTIVE SUMMARY

The executive summary of the water audit report furnished in this section briefly gives the identified water conservation measures, that can be implemented in a phased manner to water conservation and increase the productivity of the college.

AREAS FOR IMPROVEMENT AND RECOMMENDATION

FRESH WATER MONITORING SYSTEM:

- ✚ Installation of “**Cloud based (IoT based) ground water extraction monitoring system**” for Borewell to quantify fresh water consumption per day in the College.
- ✚ Install water flow meters (Mechanical or Electronics) in distribution network, like college building, main line and gardening line for quantity per day water consumption and waste water generation in the College campus.

WASTE WATER TREATMENT PLANT

- ✚ Waste water generated from various departments and canteen should be collect in separate waste water collection tank. It should be treated in proposed STP and ETP plants after that treated water reuse activity like gardening, toilet and wash room etc.

RAIN WATER HARVESTING SYSTEM

- ✚ Install rain water harvesting system in college. It was observed that there is good potential for rain water harvesting systems.
- ✚ The calculated rainwater harvesting potential is about 1404.48 m³/year. Based on total build up area of the college.





**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



OTHER SUGGESTIONS.

Some of the very important suggestions are: -

- ✚ Prepare the water management policy, and work towards creating and implementing a strategy to reduce the water consumption.
- ✚ Conduct awareness programs for water conservation and sustainable development.
- ✚ Establish institutional ecology policy and set an example of environmental responsibility and practices of resource conservation, recycling, waste management.
- ✚ Involve all stakeholders and encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in water conservation and sustainable development.
- ✚ Collaborate for interdisciplinary approaches to develop curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- ✚ Promote 3R education policy (reduces, reuse, and recycle) in campus.
- ✚ Arrange training programmes on water management system and nature conservation.
- ✚ Ensure participation of students and teachers in local water issues.
- ✚ Conduct seminars, workshops and exhibitions on water and environmental education.





**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



**CHAPTER-1
INTRODUCTION**

1.1 About College

Over the last three decades Dr R.G Bhoyar's Group of Institutions has set an exalted example in the field of education, reaching beyond borders of knowledge. New Arts, Commerce and Science College, Wardha is one among many in this group. Founded by Dr Rajesh Bhoyar, an eminent intellect and philanthropist, in the year 1990, New Arts, Commerce and Science College has inspired students across India. He has established this College at Wardha making the ideals of Mahatma Gandhi as holistic foundation to it. Here the system of teaching is more of learners' oriented. A practical approach to the methods of teaching is being followed to prepare the students, face the challenges of life boldly.

This group strongly believes in imparting and propagating knowledge & live skills in core and frontier areas of all major fields of Science, Arts, Commerce and Management through innovative educational programs. The students are developed into a new group of professionals with an exceptional competence and a deep sense of values for life and commitment towards their responsibilities both for profession and nation as well. Here the students are not just taught but mentored, they are not just forced after the academics but guided to achieve success.

The major asset of NACSC is its staff members who are well qualified and hardworking. They are well committed in discharging their responsibilities. The faculty members are not just teachers but they are mentors. They guide their students in every possible aspect of their academics and help them to move on successfully.

Being a visionary scholar the Chairman Dr.R.G Bhoyar believed that educational institutions are the epicentres of knowledge. They should transform the unpolished and uncut stones into sparkling gems. He initiated variant number of educational programs like, Diploma, Bachelors and Master Levels in Humanities, Commerce, Science, Biotechnology, Computer Science/IT, Management, Social Work, Pharmacy and Vocational Education at NACSC





**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



With distinct uniqueness Dr.R.G Bhoyar Group of Institutions stands like an example among all educational Institutions in Vidarbha region.

Vision:

Our vision is to generate and propagate education through harmonious fusion of practical knowledge with values of life. We aim to develop our institution into an outstanding centre to provide quality education by effective Teaching and Learning programs. We are also committed to cater to the needs of rural as well as urban students with our progressive endeavor to enhance their skills and capabilities to face global market.

Mission:

To cater to the needs of rural, socially & economically backward students and make them self-reliant in all aspects of life

- To propagate, provide and preserve knowledge
- To cater to the needs of rural, socially & economically backward students and make them self-reliant in all aspects of life
- To acquire excellence in teaching methods
- To empower girl students in exalted way so that they can be self determined to achieve goals of life and create their identity in the society
- To meet regional needs, community development programs are conducted regularly through various extension activities
- To cultivate & incorporate values and develop a responsible and productive citizen of nation
- To expand developmental opportunities available to all students and faculty as well
- To build alliances from academicians of various universities to enhance and upgrade the knowledge of students & faculty as well
- To provide practical and skill-based training for self-employment
- To promote and develop use of ICT learning by considering global challenges
- To develop exciting research environment



**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



- To undertake multiple extension activities to reflect aims and objectives of our Institution

Objectives:

- The basic motto of the college is "Nothing is sacred as knowledge in this world" and with this motive, the college has set following Objectives-
- To establish centre of higher education offering undergraduate and post graduate courses to serve rural society.
- Community development through various extension activities.
- To provide practice and skill-based knowledge to students for creating self-employment and employment opportunities in private and public sectors.
- To promote the use of ict in teaching, learning, research and evaluation.
- To undertake continuous assessment of students.
- To develop research attitude among students and teachers to cater to the local and global needs.
- To create environmental awareness to save and conserve nature
- To develop scientific temperament among students and teachers.
- To promote nationalistic ideals and values among students and teachers.





**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



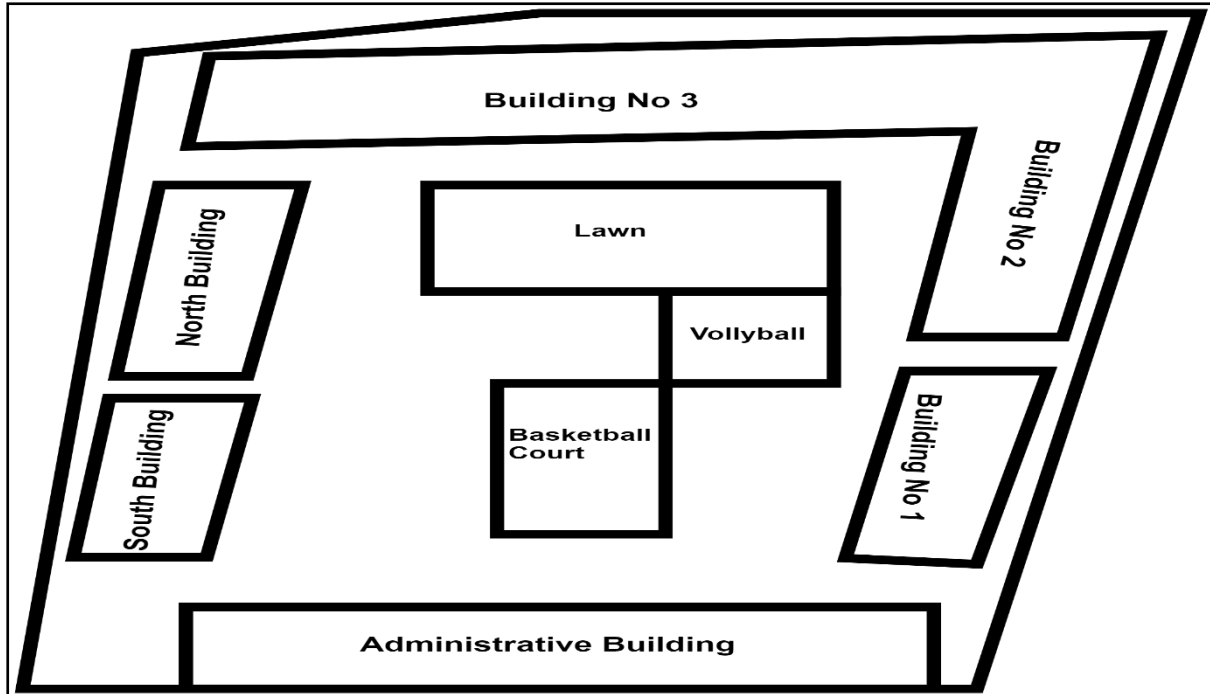
1.2 About College Campus:

Name of Teaching Department

- Department of Languages
- Department of Humanities
- Department of Sociology
- Department of Political Science
- Department of Home Economics
- Department Of Commerce and Management
- Department Of Biotechnology
- Department Of Computer Science
- Department Of Chemistry
- Department Of Physics
- Department Of Mathematics
- Department Of Social Work



College Building Layout: -



Satellite image of college





**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



1.3 Energy Monitoring Committee.

Sr.No	Name of Member	Designation	Designation
1	Mr. Sandip S. Petare	Assistant Professor	Coordinator & Botanist
2	Prof. Vaibhavi Ughade	Assistant Professor	Member
3	Shri. Sagar Bansod	RFO, Wardha (M.S)	Member
4	Dr. C.M Wadatkar	Botanist	Member
5	Dr. Madan Ingle	Director Physical Education	Member
6	Mr. Pramod Tadas	Librarian	Member
7	Dr. Suraj Deshmukh	Assistant Professor	Member
8	Mr. Pankaj Dengle	Student	Member
9	Miss. Gauri Mule	Student	Member

1. 4 Energy Audit Team

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

- ✚ **Mr. Rakesh Pathak,** [Director]
- ✚ **Dr. Suresh Soni** [Reviewer]
- ✚ **Mrs. Laxmi Raikwar Singadiya,** [Energy Engineer]
- ✚ **Mr. Sachin Kumawat** [Project Engineer]
- ✚ **Mr. Ajay Nahra,** [Site Engineer]





**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



1.5 About Environment Auditing

Water audits can be a highly valuable tool for institute in a wide range of ways to improve their energy, environment and economic performance. while reducing wastages and operating costs. Water audits provide a basis for calculating the economic benefits of water conservation projects by establishing the current rates of water use and their associated cost.

1.6 Objectives of Environment audit

The general objective of water audit is to prepare a baseline report on water conservation measures to mitigate consumption, improve quality and sustainable practices.

The specific objectives are:

- ✚ To monitor the water consumption and water conservation practices.
- ✚ To assess the quantity of water, usage, quantity of waste water generation and their reduction within the college.

1.7 Target Areas of Environment audit

This indicator addresses water sources, water consumption, irrigation, storm water, appliances and fixtures 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.





**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



1.8 Methodology followed for conducting Environment audit

Step 1: Walk through survey

- ✚ Understanding of existing water sourcing, storage and distribution facility.
- ✚ Assessing the water demand and water consumption areas/processes.
- ✚ Preparation of detailed water circuit diagram.

Step 2: Secondary Data Collection

- ✚ Analyse historic water use and wastewater generation
- ✚ Field measurements for estimating current water use
- ✚ Metered & unmetered supplies.
- ✚ Understanding of “base” flow and usage trend at site
- ✚ Past water bills
- ✚ Wastewater treatment scheme & costs etc.

Step 3: Site Water Audit Planning (based on site operations and practices)

- ✚ Preparation of water flow diagram to quantify water use at various locations
- ✚ Wastewater flow measurement and sampling plan

Step 4: Conduction of Detailed Water Audit & Measurements

- ✚ Conduction of field measurements to quantify water/wastewater streams
- ✚ Power measurement of pumps/motors
- ✚ Preparation of water balance diagram
- ✚ Establishing water consumption pattern
- ✚ Detection of potential leaks & water losses in the system
- ✚ Assessment of productive and unproductive usage of water
- ✚ Determine key opportunities for water consumption reduction, reuse & recycle.

Step 5: Preparation of Water Audit Report

- ✚ Documentation of collected & analysed water balancing and measurement details
- ✚ Projects and procedures to maximize water savings and minimize water losses.
- ✚ Opportunities for water conservation based on reduce/ recycle/ reuse and recharge options



CHAPTER- 2 WATER CONSUMPTION AND WASTE WATER SOURCES

2.1 Details of Source of Fresh Water and Use Areas:

The main source of freshwater is Borewell for the college. The freshwater is mainly used for drinking, housekeeping, gardening, domestic activity and new construction project. Details of the pumps are given in table.

Sr. No	Source of Water Fresh Water	Location	Depth (ft/m)	Type of Pumps	Rated (HP)	Running Hr per day
1	Borewell	Main Gate	Approximately 100	Submersible	1.5	4-6
2	Borewell	Near Library	Approximately 100	Submersible	1.5	2-4
3	Borewell	Near Chemistry Lab	Approximately 100	Submersible	1.5	4-6

2.2 Water Accounting & Metering system:

There is requirement of water flow meters on Borewell line to quantify per day ground water extraction from Borewell.



Figure 2.1 - fresh water supply for college campus

2.3 Water Storage Capacity in College Campus: -

There is different type of tank available in college for water storage like Underground RCC tank, Overhead RCC tank etc.

Table 2.2: - Water Storage tank in college campus

Type of Tank	Location	Storage Capacity (m ³)	Dimensions (Feet)	Remark
Over Head Tank	Top of Main Building	10	5 x 12 X 5	RCC Tank
Over Head Tank	Top of Wing A	8.45	4 x 12 X 5	RCC Tank
Over Head Tank	Top of Wing 6	8.45	4 x 12 X 5	RCC Tank

Photographs of water storage tanks.



Figure 2.2: - Water Storage Tank and capacity of College Campus

2.4 Water use areas in College Campus: -

Water is preliminary used for drinking, domestic, gardening and activity. Audit team visited various departments and buildings to determine appliances. The details of washroom, toilet and taps are given in table.

Sr. No	Name of Building	No. of taps Drinking Water	No. of taps Service Water
1	Admin Building	04	42
2	Wing A	04	58
3	Wing B	04	24
	Total	12	124

2.5 Fresh Water uses for Gardening:

College has installed water sprinkler system for gardening **It is appreciable.** The one of major contribution from fresh water consumption is watering for plants and garden in college campus. College has a good potential installation of “Automatic Watering 360 adjustable misting nozzle irrigation Dripper’s system” for plants. adjustable drip irrigation tools to provide different amounts of water depending on the water requirements of different plants. The drip speed can be set as for indoor and outdoor plants.



Figure: - Technology for Sprinkler system for gardening area.

2.6 Waste Water Generation sources: -

At present waste water generated from various departments like Admin building, Wing -A and Wing-B clinical activity like washrooms, handwash and RO rejected etc is discharge into drain line.it should be collect is separate tank and treat in proposed STP and ETP plants. After that treated water reuse activity like gardening, toilet and wash room etc.

Sr. No	Key Water Usage Section	Type of water used (raw, treated etc.)	Water Consuming activities
1	Admin Building	Fresh Water	Drinking and other uses
2	Wing- A	Fresh Water	Drinking and other uses
3	Wing- B	Fresh Water	Drinking and other uses

detail of Toilet and urinal in Campus

Sr. No	Name of Building	Hand Wash	Urinals	Toilets
1	Admin Building	28	15	07
2	Wing A	58	11	05
3	Wing B	20	10	04
	Total	106	36	16



Figure. Waste Water Generation sources



CHAPTER- 3 RAIN WATER HARVESTING SYSTEM

3.1. Rain water Harvesting systems

There is good potential for develop rain water harvesting system in college. The rainwater harvesting is a technique to capture the rainwater when it precipitates, store that water for direct use or charge the groundwater and use it later.

There are typically four components in a rainwater harvesting system:

- ✚ Roof Catchment.
- ✚ Collection.
- ✚ Transport.
- ✚ Infiltration or storage tank and use.

If rainwater is not harvested and channelized its runoffs quickly and flow out through storm-water drains. For storm-water management the recharge pits, percolation pits and porous trenches are constructed to allow storm water to infiltrate inside the soil.

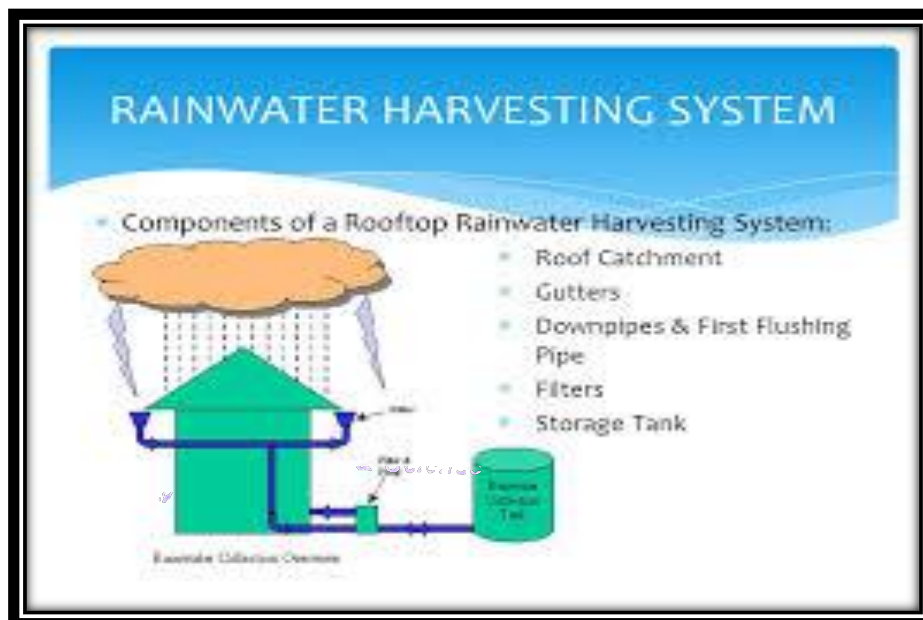


Figure: - Components of a rooftop rainwater harvesting system



3.2 Rainwater Harvesting Potential of the College

The college has total build-up area is approx. 1500 m². The average annual rainfall 1.064 m and runoff coefficient 0.88 are considered for commercial building. Accordingly, above figures and consideration, estimated rainwater harvesting potential for the college is about 1404.48 m³/year. The following Mathematical Equation is used for the calculation.

$$\text{RWH Potential} = \text{Rainfall (m)} \times \text{Area of catchment (m}^2\text{)} \times \text{Runoff coefficient}$$

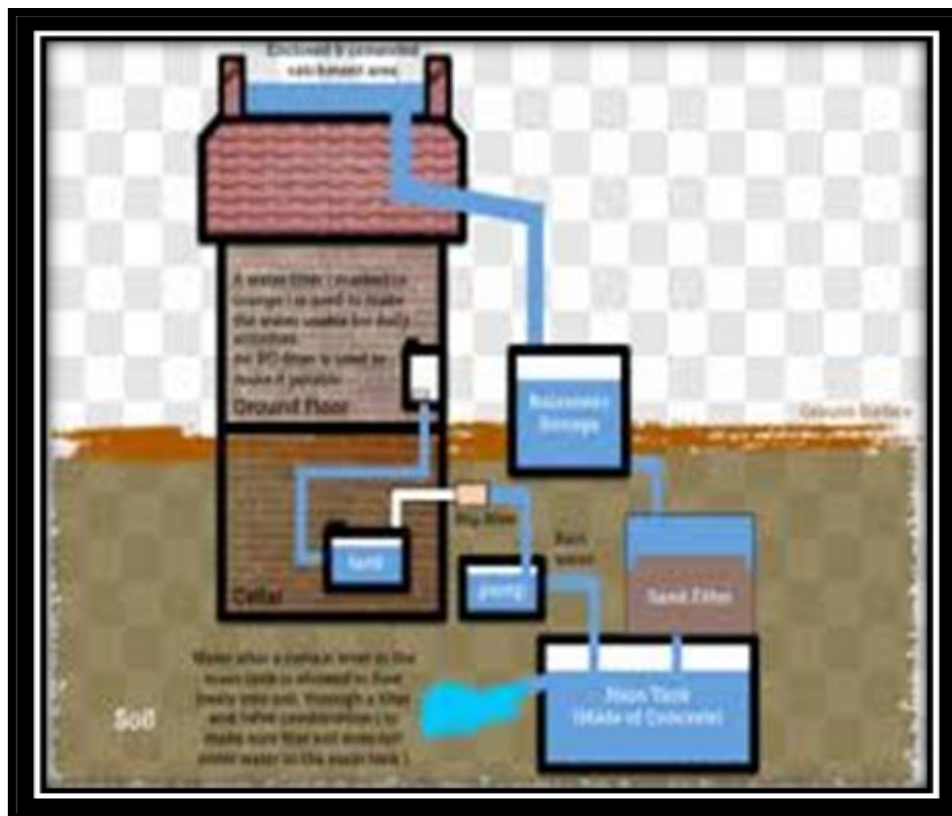


Figure: - Proposed Rain water harvesting system





**Environment Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



**END OF THE
REPORT**



**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



**ENERGY AUDIT REPORT
CONSULTATION REPORT**



**Indraprastha New Arts, Commerce and Science
College, Nalwadi, Wardha (M.H) 442001**

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

Flat No. 201, Om Apartment, 214 Indrapuri Colony,
Bhawarkuwa, Indore – 452 001 (M. P.), India

0731-4948831, 7869327256

Email ID: eempirical18@gmail.com

www.eeplgroups.com

(2021-22)

CONTENTS

Sr. No.	Items	Page No
I	ACKNOWLEDGEMENT	3
II	EXECUTIVE SUMMARY	4
Chapter-1	Introduction	6
1.1	About College	6
1.2	About College Campus	9
1.3	Energy Monitoring Committee	11
1.4	Energy Audit Team	11
1.5	About Energy Audit	12
1.6	Objectives of Energy Auditing	12
1.7	Methodology:	13
Chapter- 2	Power Supply System and Bill analysis	14
2.1	Electrical Bill analysis 2020-21	14
2.2	DG Sets	15
2.3	Photovoltaic Solar System	16
2.4	Connected Load of College	17
2.5	Some photograph of Equipment's	18



**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the management of **Indraprastha New Arts, Commerce and Science College Wardha (M.H)** for giving us an opportunity to conduct Energy audit for the college.

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 the course of 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)
Chartered Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]



EXECUTIVE SUMMARY

The executive summary of the energy audit report furnished in this section briefly gives the identified energy conservation measures and other recommendation during the project that can be implemented in a phased manner to conserve energy, increase productivity inside the College campus.

ENERGY MANAGEMENT INITIATIVE TAKEN BY COLLEGE

✚ 8.90 KWp SOLAR PHOTOVOLTAIC ROOFTOP INSTALLATION:

College has 8.90 KWp solar photovoltaic roof top grid connected system installed college building.

RECOMMENDATION

✚ LIGHTING SYSTEM

Replacement of “conventional T-12 (40 Watt) and T-8 (36 Watt)” tube light by energy efficient LED lighting fixture was taken up phased manner.

✚ TIMER CONTROLLED STREET LIGHTS

Installation of “Timer control on Focus Light and street lighting” in college campus is recommended.

✚ CEILING FAN AND EXHAUST FAN:

Replacement of “conventional ceiling fan (60 Watt to 80 Watt)” by energy efficient star rated fan or BLDC based energy efficient fan (20 to 25 Watt) in “admin building, class rooms, laboratories and faculties cabin” have great potential for energy saving.

Replacement of “conventional exhaust fan (90 Watt to 125Watt)” by energy efficient star rated fan or BLDC based energy efficient Fan (20 to 40 Watt) in old building class rooms, laboratories and faculties cabin have great potential for energy saving.





**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



✚ IOT BASED ENERGY MONITORING SYSTEM AT MAIN FEEDER

- Installation of “Cloud based (IoT based) energy monitoring system” including harmonic measurement (total voltage and current harmonic distortion %) in power house will be good initiate for energy monitoring as well as student demo project for management. Expected energy saving potential about 2 to 4%.
- Installation of energy meters on PCC panel with IOT system will monitor line losses of the system. It will give real time measurement of power factor and line losses from the cable.
- Installation of Cloud based (IoT based) energy monitoring system” on Solar system for monitoring solar unit generation.

✚ SYNCHRONIZATION OF DG SET WITH SOLAR SYSTEM

- Installation of “Cloud based fuel and unit generation monitoring system” in DG set will help to monitor specific unit generation by DG set failure of the grid power.
- It was observed that during the power failure of the grid, solar unit generations also stop. Synchronization of the solar system with DG set increases the utilization capacity of the solar system.

✚ Energy Management Workshop and Training:

- Develop energy management policies for college. Establish a procurement policy that is energy saving and eco-friendly.
- Conduct awareness and training programs for faculty, student and non-teaching staffs. Conduct seminars, workshops and exhibitions on energy management education.
- Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in energy management system.





**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



CHAPTER-1 INTRODUCTION

1.1 About College

Over the last three decades Dr R.G Boyar's Group of Institutions has set an exalted example in the field of education, reaching beyond borders of knowledge. New Arts, Commerce and Science College, Wardha is one among many in this group. Founded by Dr Rajesh Bhojar, an eminent intellect and philanthropist, in the year 1990, New Arts, Commerce and Science College has inspired students across India. He has established this College at Wardha making the ideals of Mahatma Gandhi as holistic foundation to it. Here the system of teaching is more of learners' oriented. A practical approach to the methods of teaching is being followed to prepare the students, face the challenges of life boldly.

This group strongly believes in imparting and propagating knowledge & live skills in core and frontier areas of all major fields of Science, Arts, Commerce and Management through innovative educational programs. The students are developed into a new group of professionals with an exceptional competence and a deep sense of values for life and commitment towards their responsibilities both for profession and nation as well. Here the students are not just taught but mentored, they are not just forced after the academics but guided to achieve success.

The major asset of NACSC is its staff members who are well qualified and hardworking. They are well committed in discharging their responsibilities. The faculty members are not just teachers but they are mentors. They guide their students in every possible aspect of their academics and help them to move on successfully.

Being a visionary scholar the Chairman Dr.R.G Bhojar believed that educational institutions are the epicentres of knowledge. They should transform the unpolished and uncut stones into sparkling gems. He initiated variant number of educational programs like, Diploma, Bachelors and Master Levels in Humanities, Commerce, Science, Biotechnology, Computer Science/IT, Management, Social Work, Pharmacy and Vocational Education at NACSC.

With distinct uniqueness Dr R.G Bhojar Group of Institutions stands like an example among all educational institutions in Vidarbha region.



**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



Vision:

Our vision is to generate and propagate education through harmonious fusion of practical knowledge with values of life. We aim to develop our institution into an outstanding centre to provide quality education by effective Teaching and Learning programs. We are also committed to cater to the needs of rural as well as urban students with our progressive endeavor to enhance their skills and capabilities to face global market.

Mission:

To cater to the needs of rural, socially & economically backward students and make them self reliant in all aspects of life

- To propagate, provide and preserve knowledge
- To cater to the needs of rural, socially & economically backward students and make them self-reliant in all aspects of life
- To acquire excellence in teaching methods
- To empower girl students in exalted way so that they can be self-determined to achieve goals of life and create their identity in the society
- To meet regional needs, community development programs are conducted regularly through various extension activities
- To cultivate & incorporate values and develop a responsible and productive citizen of nation
- To expand developmental opportunities available to all students and faculty as well
- To build alliances from academicians of various universities to enhance and upgrade the knowledge of students & faculty as well
- To provide practical and skill-based training for self-employment
- To promote and develop use of ICT learning by considering global challenges
- To develop exciting research environment
- To undertake multiple extension activities to reflect aims and objectives of our Institution





**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



Objectives:

- The basic motto of the college is "Nothing is sacred as knowledge in this world" and with this motive, the college has set following Objectives-
- To establish centre of higher education offering undergraduate and post graduate courses to serve rural society.
- Community development through various extension activities.
- To provide practice and skill-based knowledge to students for creating self-employment and employment opportunities in private and public sectors.
- To promote the use of ict in teaching, learning, research and evaluation.
- To undertake continuous assessment of students.
- To develop research attitude among students and teachers to cater to the local and global needs.
- To create environmental awareness to save and conserve nature
- To develop scientific temperament among students and teachers.
- To promote nationalistic ideals and values among students and teachers.





**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



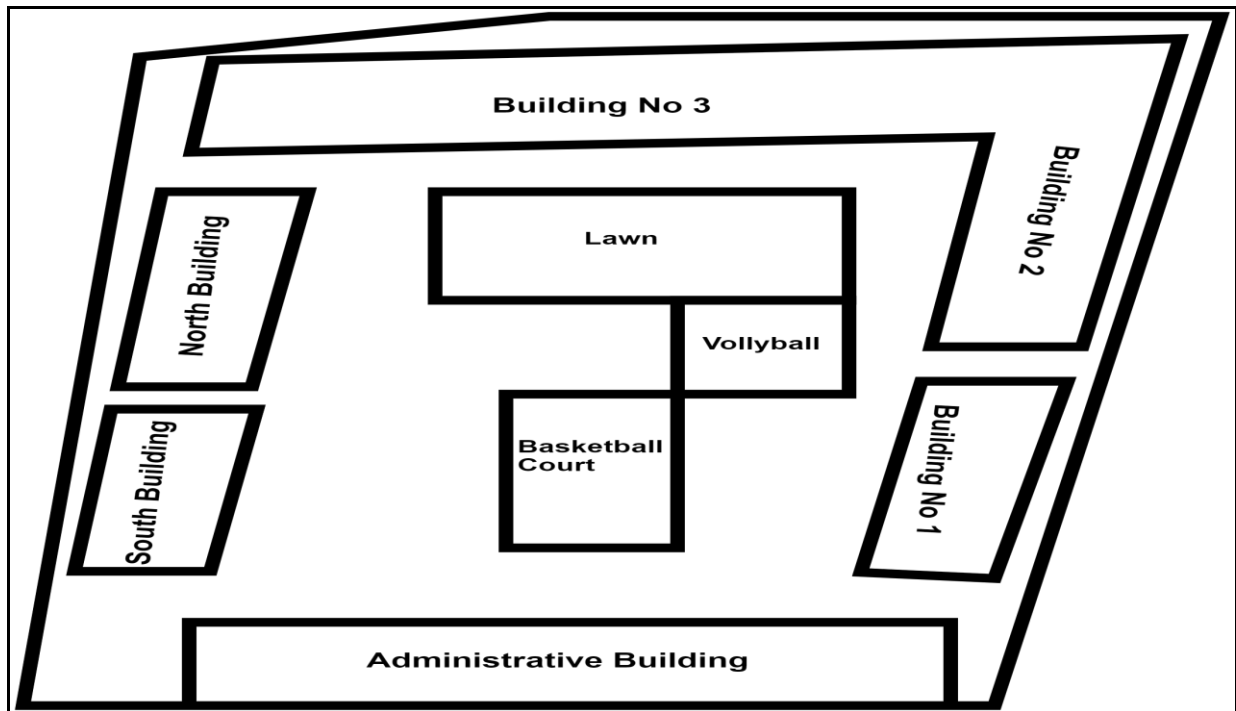
1.2 About College Campus:

Name of Teaching Department

- Department of Languages
- Department of Humanities
- Department of Sociology
- Department of Political Science
- Department of Home Economics
- Department Of Commerce and Management
- Department Of Biotechnology
- Department Of Computer Science
- Department Of Chemistry
- Department Of Physics
- Department Of Mathematics
- Department Of Social Work



College Building Layout: -



Satellite image of college



1.3 Energy Monitoring Committee.

Sr.No	Name of Member	Designation	Designation
1	Mr. Sandip S. Petare	Assistant Professor	Coordinator & Botanist
2	Prof. Vaibhavi Ughade	Assistant Professor	Member
3	Shri. Sagar Bansod	RFO, Wardha (M.S)	Member
4	Dr. C.M Wadatkar	Botanist	Member
5	Dr. Madan Ingle	Director Physical Education	Member
6	Mr. Pramod Tadas	Librarian	Member
7	Dr. Suraj Deshmukh	Assistant Professor	Member
8	Mr. Pankaj Dengle	Student	Member
9	Miss. Gauri Mule	Student	Member

1. 4 Energy Audit Team

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

- ✚ **Mr. Rakesh Pathak,** [Director]
- ✚ **Dr. Suresh Soni** [Reviewer]
- ✚ **Mrs. Laxmi Raikwar Singadiya,** [Energy Engineer]
- ✚ **Mr. Sachin Kumawat** [Project Engineer]
- ✚ **Mr. Ajay Nahra,** [Site Engineer]





**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



1.5 About Energy Audit

Energy audit helps to understand more about the ways energy is used in any plant and helps in identifying areas where waste may occur and scope for improvement exists. The overall energy efficiency from generation to final consumer becomes 50%. Hence one unit saved in the end user is equivalent to two units generated in the power plant.

Energy audit is the most efficient way to identify the strength and weakness of energy management practices and to find a way to solve problems. Energy audit is a professional approach in utilizing economic, financial, and social and natural resources responsibility. Energy audits “adds value” to management control and is a way of evaluating the system.

Empirical Exergy Private Limited (EEPL), Indore M.P. carried out the “Energy Audit” at the site to find gaps in the energy consumption pattern for Indraprastha New Arts, Commerce and Science College, Nalwadi, Wardha. A technical report is prepared as per the need and the requirement of the project.

1.6 Objectives of Energy Auditing

An energy audit provides vital information base for overall energy conservation program covering essentially energy utilization analysis and evaluation of energy conservation measures. It aims at:

- Identifying the quality and cost of various energy inputs.
- Assessing present pattern of energy consumption in different cost centers of operations.
- Relating energy inputs and production output.
- Identifying potential areas of thermal and electrical energy economy.
- Highlighting wastage in major areas.
- Fixing of energy saving potential targets for individual cost centers.
- Implementation of measures for energy conservation & realization of savings.





**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



1.7 Methodology:

Methodology adopted for achieving the desired objectives viz.: Assessment of the current operational status and energy savings include the following:

- ✚ Discussions with the concerned officials for identification of major areas of focus and other related systems.
- ✚ Team of engineers visited the site and had discussions with the concerned officials / supervisors to collect data / information on the operations and load distribution within the plant and same for the overall premises. The data was analyzed to arrive at a base line energy consumption pattern.
- ✚ Measurements and monitoring with the help of appropriate instruments including continuous and / or time-lapse recording, as appropriate and visual observations were made to identify the energy usage pattern and losses in the system.
- ✚ Trend analysis of costs and consumptions.
- ✚ Capacity and efficiency test of major utility equipment's, wherever applicable.
- ✚ Estimation of various losses
- ✚ Computation and **in-depth analysis** of the collected data, including utilization of computerized analysis and other techniques as appropriate were done to draw inferences and to evolve suitable energy conservation plan/s for improvements/reduction in specific energy consumption.





**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



CHAPTER- 2

POWER SUPPLY SYSTEM AND BILL ANALYSIS

2.1 Power Station and Bill analysis 2020-21

- ✚ Power Supply From: - MSEDCL
- ✚ Customer Number: - 390040103654
- ✚ Sectioned Load: - 8.8 KW

Sr.No.	Month & Year	Unit (KWH)	Amount (Rs.)
1	Feb-21	0	343
2	Mar-21	0	343
3	Apr-21	0	343
4	May-21	962	4845
5	Jun-21	892	4517
6	Jul-21	616	3226
7	Aug-21	0	343
8	Sep-21	0	343
9	Oct-21	0	343
10	Nov-21	0	343
11	Dec-21	0	337
12	Jan-22	0	333
	Total	2470	15659

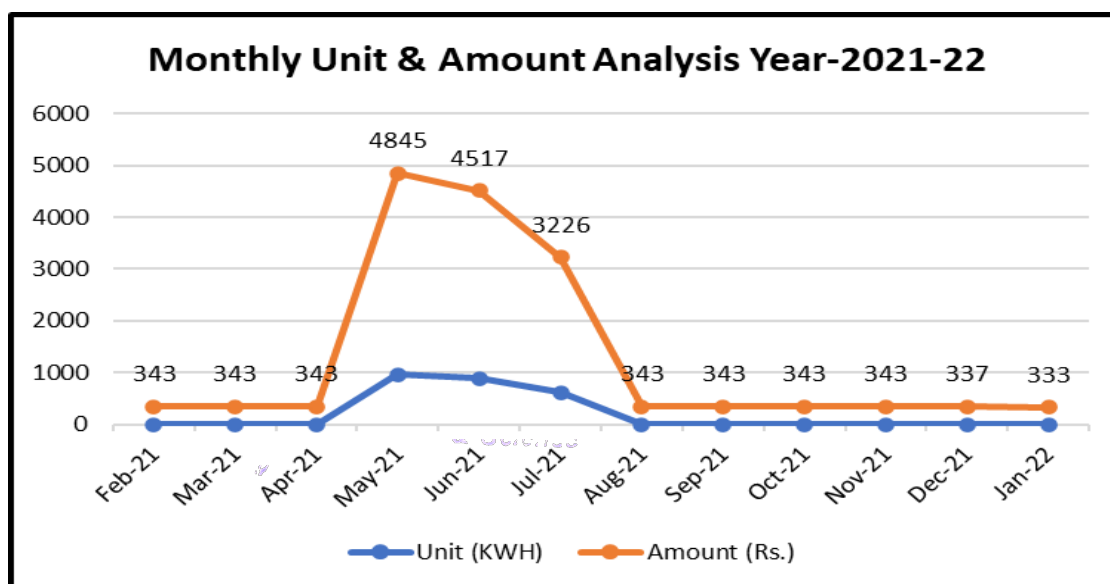


Figure: - Graphical Presentation of Unit Consumption Year-2021-22



2.3 DG Set: -

There is 1 DG set in power house . Detailed of the DG Sets are given below :

Sr. No.	Parameter	Technical Specification DG Set	Technical Specification DG Set
1	Make	Kirloskar Brothers Ltd.	Kirloskar Brothers Ltd.
2	M/C No	CS3D107L30917	CS1BO08H22420
3	Capacity	30 KVA	15 KVA
4	Rated Voltage	415	240
5	Full load current	48.7	62.5
6	Frequency	50	50
7	Power factor	0.80	0.80
8	RPM	1500	1500
9	Phase	3	1



Figure: - DG set College premises

Observation & Suggestion:

- DG set use only in case of grid power failure.
- There is no system to monitor fuel consumptions w.r.t. unit generation.

2.4 Connected Load of College:

Sr. No	Name of Building	Electrical Equipment	Rated Power (Watt)	Quantity (no)
1	Admin Building	Tube Light (FTL)	40	54
2		Tube Light (LED)	20	03
3		Ceiling Fan	80	89
4		Window AC	1500	05
5		Laptop	35	02
6		Printer	75	10
7		Photocopy M/c	550	03
1	Wing A	Tube Light (FTL)	40	93
2		Tube Light (LED)	20	00
3		Ceiling Fan	80	143
4		Exhaust Fan	150	08
5		PC	75	70
6		Printer	75	05
1	Wing B	Tube Light (FTL)	40	30
2		Tube Light (LED)	20	00
3		Ceiling Fan	80	107
4		Exhaust Fan	150	02
5		Window AC	2000	06
6		PC	75	01
7		Laptop	35	01
8		Printer	75	02
9		Photocopy M/c	550	01

Street Light in Campus: -

Sr. No	Location	Type of Light	Rated Watt	Quantity (NO)
1	Main Building dome	HPSV Lamp	400 Watt	04
2		Metal Halide	250 Watt	0
3		LED	100 Watt	2
4		Solar Light	30 Watt	0



2.5 Some Photograph of Electrical Equipment's: -



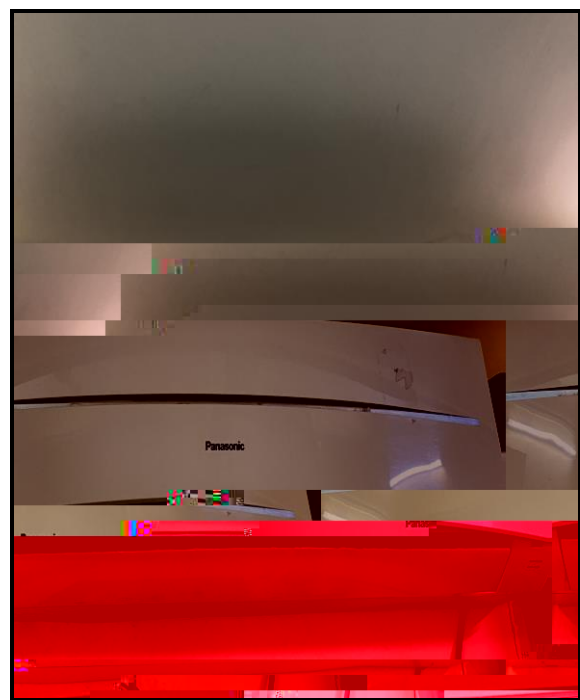
Photot Copy Machine



Celling Fan



RO and Water Cooler



AC

Figure:- Electrical Equipment in College





**Energy Audit Report of
Indraprastha New Arts Commerce and Science
College, Nalwadi, Wardha (M.H)
Year 2021-22**



**END OF THE
REPORT**