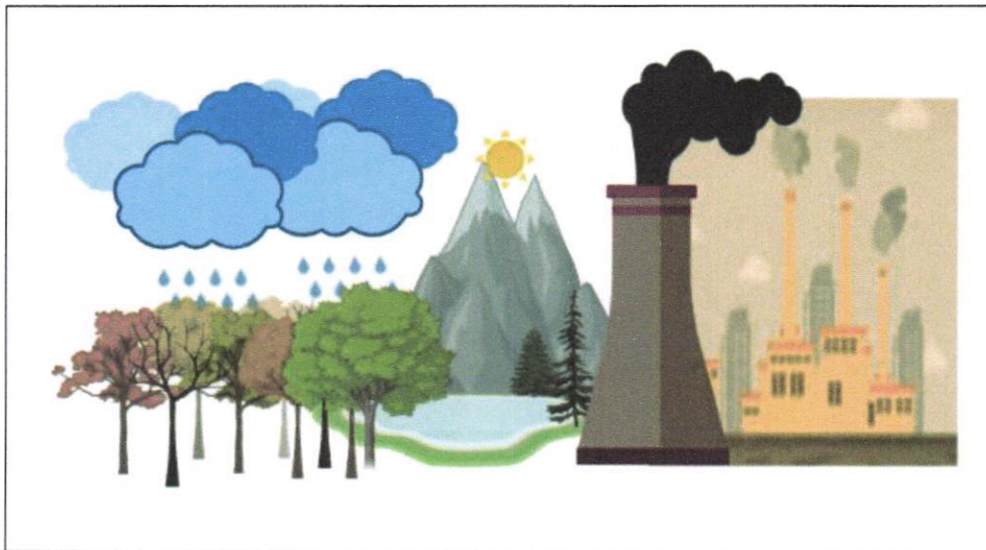




## **Gokhale Education Society**



## **Environment and Energy Usage**

## **ENVIRONMENT AND ENERGY USAGE POLICY**

---

This is to manage energy in such systematic way so as to minimize its impact on the environment. The policy implies to explore the renewable energy resources to reduce the burden of the Government to find out substitute natural resources as solution to the energy crisis. This environment and energy policy is binding for all the components of the College and implies to all its stakeholders and to the various activities undertaken by the college. It will help us to embed efficiency and environmental awareness into our everyday activities, thus helping us to realize our responsibilities and commitment to conservation of natural resources and to limit its usage. College devoted to environmental awareness, to undertake green initiatives, and to conduct green literacy programs to save energy and to protect the environment.

### **a) Usage**

To assess our energy usage and measure its impact on the environment.

### **b) Emission Count**

To count CO<sub>2</sub> emissions generated by our vehicle transportations.

### **c) Environment friendly vehicles**

To reduce local air pollution emissions using environment friendly vehicles using bicycles, public transportation and use of pedestrian friendly roads.

### **d) Solar Panels**

To install photo voltaic solar panels for the generation of alternate energy.

### **e) LED Bulbs**

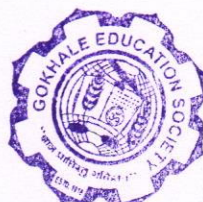
To install LED bulbs in the complete campus to save energy.

### **f) Energy Audit**

- To do Energy Audit
- Make strategies for optimizing consumption.
- To take review of Solar PV, Heater, Biogas etc.

### **g) Other measures**

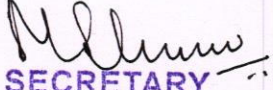
- To develop systematic waste management mechanism.
- To develop rain harvesting unit.
- To undertake plantation drive.





- To take additional measures to continuously improve energy consumption.
- To develop and maintain an environmental and energy management systems
- To ensure the availability of necessary resources to achieve objectives.
- To encourage use of advanced technologies to minimize energy consumption, atmospheric emissions and noise particularly from vehicle fleets.
- To engage in dialogue with the Government agencies, municipal corporation and actively work with the local organizations in the areas of environment, energy efficiency and sustainable development.
- To monitor and respond to emerging environmental and energy issues. To strengthen employees and students' environmental knowledge and skills in order to improve our own environmental performance.
- To provide information and training opportunities on energy saving measures.
- To offer opportunities for employees and students to engage in initiatives those contributes to environmental protection.
- To train our employees and students through SENSE club to make them "Go Green Specialist" and partners to plant trees each year.



  
**SECRETARY**  
Gokhale Education Society



GV/EA/05-23/163

# Energy Audit Certificate (As per Green Building Parameters)

The study is conducted as per Indian and International Green Building Standards initiated in the capacity of an Accredited & Certified Green Building Professional

It is awarded for **2021-2022 and 2022-2023** to the Esteemed Institution

(Analysed for 2 years and extended validity for 1 year, thus total 3 years)

Gokhale Education Society's

## Sir Dr. M. S. Gosavi College of Pharmaceutical Education and Research

Prin. T. A. Kulkarni Vidyanagar, College Road, Nashik Pin. 422 005, Maharashtra, India

(Site visit held on 26 April 2023 )

As part of the Institution's initiatives for a Healthy & Sustainable Institute the audit was conducted.  
We appreciate the immense efforts taken by Staff and students towards the Energy Management and Conservation.

Issued on **Thursday, 04 May 2023** and valid till **30 April 2024**

  
**Ar. Nahida Abdulla Shaikh**

"Elite 100 Green Architects of India" Econaur, 2022

Certified Green Building Professional (Registration. No. 22/718)

**Project Head and Green Building Professional-Consultant**

Sustainable Academe I Sustainability Department of Greenvio Solutions, Naigaon

An environment Design and Consultancy developing Healthy and Sustainable Environments

Email: [sustainableacademe@gmail.com](mailto:sustainableacademe@gmail.com) | [greenviosolutions@gmail.com](mailto:greenviosolutions@gmail.com)



Website: <https://thegreenviosolutions.co.in/>



# ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2021 - 2022 & 2022 - 2023

Sustainability study  
**AUDIT REPORT**

Studied for  
Gokhale Education Society's  
**Sir Dr. M. S. Gosavi College of  
Pharmaceutical Education and Research**

Prin. T. A. Kulkarni Vidyanagar, College Road,  
Nashik Pin. 422 005, Maharashtra, India

Studied in the capacity of

Accredited and Certified  
Green Building Professional



Website: <https://thegreenviosolutions.co.in/>

Email: [greenviosolutions@gmail.com](mailto:greenviosolutions@gmail.com)

Valid till **April 2024**



## Disclaimer

The Audit Team has prepared this report for the **Gokhale Education Society's Sir Dr. M. S. Gosavi College of Pharmaceutical Education and Research** located Prin. T. A. Kulkarni Vidyanagar, College Road, Nashik Pin. 422 005, Maharashtra, India based on input data submitted by the College analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the Hon'ble Management and College. The warranty or undertaking, expressed or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

The audit is a thorough study based on the inspection and investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh who is as an Accredited and Certified Green Building Professional-Architect. Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

### Greenvio Solutions

*Developing Healthy and Sustainable Environments*

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

Palghar District, Maharashtra- 401208

[sustainableacademe@gmail.com](mailto:sustainableacademe@gmail.com)



## Acknowledgement

The Audit Assessment Team thanks the **Gokhale Education Society's Sir Dr. M. S. Gosavi College of Pharmaceutical Education and Research, Maharashtra, India** for assigning this important work of Energy Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Prin. S. B. Pandit**, President & Chairman; **Dr. R. J. Gujarathi**, Vice Chairman; **Sir Dr. M. S. Gosavi**, Secretary & Director General; **Dr. Mrs. Deepti Deshpande**, Director (HR); **Mr. P. M. Deshpande**, Director (Project); **Mr. S. M. Gosavi**, Director (E&M); Zonal Secretaries - **Prin. P. A. Raut** (Palghar Zone); **Dr. Mrs. S. V. Sant** (Mumbai Zone); **Dr. R. M. Kulkarni** (Nashik Zone) and everyone from the Management.

Our heartfelt thanks to Chairpersons of the entire process **Dr. Sunil V. Amrutkar**, Principal & Professor, M.Pharm. Ph. D. (Pharmaceutical Chemistry) for the valuable inputs.

We are also thankful to **College's Task force the faculty members** who have collected data required - **Dr. Prashant L. Pingale**, Vice Principal & IQAC Coordinator, M.Pharm. Ph.D. (Associate Professor, Department of Pharmaceutics); **Dr. Dattatraya M. Shinkar**, NAAC coordinator, M. Pharm., Ph.D., (Associate Professor, Department of Pharmaceutics); **Mr. Vishal B. Jadhav**, M. Pharm. (Assistant Professor, HOD, Department of Pharmacology) and **Ms. Deepali D. Bhandari**, M. Pharm. (Assistant Professor, Department of Pharmaceutical Chemistry).

We highly appreciate the assistance of **Mrs. Savita R. Walimbe**, Assistant Registrar; **Mr. Dhiraj Rajgire**, Lab Technician; **Mrs. Swati S. Mahajan**, Store keeper and the **entire Teaching, Non-teaching and Admin staff** for their support while collecting the data.

### Sustainable Academe

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208



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DETAILED REPORT



**Evidence documents for Site visit of external audit team**

Audit team headed by external expert - Ar. Nahida Abdulla  
 Accredited & Certified Green Building Professional, ISO IA (IMS)  
 Audit objective: Green Building up gradation of the premises

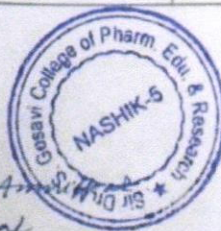
Audits covered:  Green audit  Energy audit  Environment audit

Institute: GES& Sir Dr. M S Gosavi college of Pharmaceutical Education & Research, Nashik - 422005, INDIA Date: 26 APRIL 2023

**Document objective: Inferences of the Site visit**

Observations (Positive aspects)	Suggestions (Improvement aspects)
<b>Green Audit</b>	
<ul style="list-style-type: none"> <li>- Excellent fire management</li> <li>- Rain water harvesting.</li> </ul>	<ul style="list-style-type: none"> <li>- Waste management should be undertaken for</li> <li>- Upgrade water management</li> </ul>
<b>Energy Audit</b>	
<ul style="list-style-type: none"> <li>- Solar system installed</li> </ul>	<ul style="list-style-type: none"> <li>- Check the system by consulting vendor of MSFB</li> <li>- Check smart campus aspect</li> </ul>
<b>Environment Audit</b>	
<ul style="list-style-type: none"> <li>- Pharmacognosy garden.</li> </ul>	<ul style="list-style-type: none"> <li>- Increase signages</li> <li>- Increase awareness of reflectance of activities through boards.</li> </ul>

Signature & round seal  
 Name: Dr. Sunit V. Am...  
 Designation: Principal  
**For the said Institute**



Signature & round seal  
 Name: Mrs. J. A. Shaikh  
 Designation: Project Coordinator  
**For The Greenvio Solutions**





**Evidence documents for Site visit of external audit team**

Audit team headed by external expert - Ar. Nahida Abdulla  
Accredited & Certified Green Building Professional, ISO 1A (IMS)  
Audit objective: Green Building up gradation of the premises

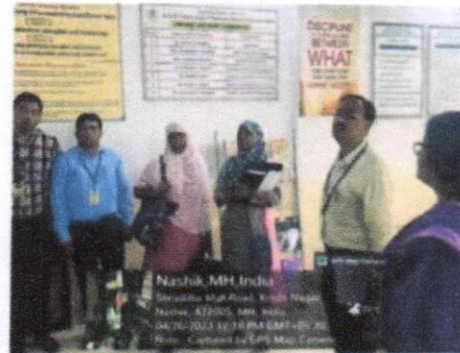
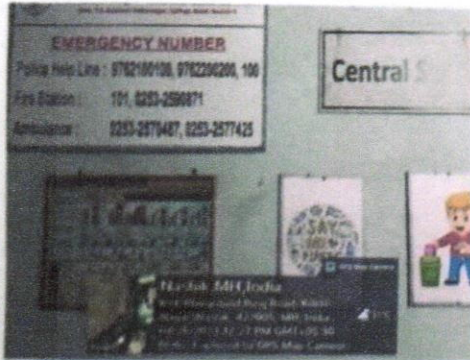
Audits covered:  Green audit  Energy audit  Environment audit

Institute: GESSE Sir P. M. S. Gosavi College of Date: 26 APRIL 2023  
Pharmaceutical Education & Research, Nashik-422005, INDIA

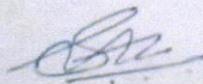
Document objective: Proof of the Site visit

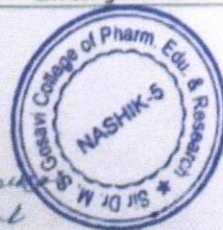


Meeting with the core team



Investigation of the systems

  
Signature & round seal  
Name: S. V. Amrut  
Designation: Principal  
For the said Institute



  
Signature and seal  
Name: Mrs. F. A. Shaikh  
Designation: Project Coordinator  
For The Greenvio Solutions





# 1. Introduction

## 1.1 About the Society

*The Gokhale Education Society was founded on 19th February 1918, on the third death anniversary of Namdar Gopal Krushna Gokhale, by his illustrious disciple late Principal T. A. Kulkarni, who was a great social worker.*

*Society has completed 100 years of useful existence and has today more than 140 units spread over three zones Mumbai, Nashik, Thane-Palghar catering 1.25 lakhs pupils as is one of the oldest and pioneering educational institution established with the main objectives of developing quality citizens through education and training and to raise the dignity of teaching profession.*

*The society has all along emphasized the holistic approach and total personality development of pupils, through educational programmes undertaken on the basis of service and dynamic leadership. The society is a veritable banyan tree. A number of branches of the Society have like its descending shoots taken roots in the ground and strengthened it.*

*The Gokhale education society is committed to the cause of student empowerment through access to education at all levels particularly higher education, to have world class citizenship through relevant courses under formal and informal streams.*

*Further the society is committed to raise the dignity of the teaching profession and establish a culture of caring and excellence by providing a wide range of professional and vocational courses for poor and downtrodden as also for the adivasis and backwards to meet the changing socio-economic needs with human values and social responsibility.*

***To achieve excellence with total quality in all activities of lifelong learning is the main motive of Gokhale Education Society.***

## 1.2 About the Institution

The College has a lush green surrounding which provides favorable environment for student to grow not only as a good Pharmacist but as a world class citizen too. It has state of the art infrastructure with fully equipped and updated library computer center.

Facilities such as fully equipped and well-furnished laboratories, class rooms, audio-visual aids, seminar Hall and facilities like tutorial rooms, common rooms, Play field, gymkhana and Hostel. College has experienced and qualified staff with academic excellence. It has received a lot of awards and accolades for its functioning; some of these are documented below:

- **"BEST INSTITUTE AWARD"** by Gokhale Education Society in Academic Year 2020-21.
- Annual Magazine **"SPECTRUM"** received **"BEST MAGZINE AWARD (Second Prize)"** by Savitribai Phule Pune University, Pune in 2019-20
- **"BEST INSTITUTE AWARD"** by Gokhale Education Society in Centenary Year.
- Annual Magazine **"SPECTRUM"** consecutively (A. Y. 2013,2014,2015) received **"BEST MAGZINE AWARD"** by Savitribai Phule Pune University, Pune
- S. V. Amrutkar received **"BEST TEACHER AWARD"** by Approvabhau Hire Mitra Mandal, Nashik
- Anupama S. Paranjpe Librarian received **'BEST EMPLOYEE/TEACHER AWARD'** by GES in on Centenary Year, 2017.
- Savita R. Walimbe received **"BEST EMPLOYEE AWARD"** from Gokhale Education Society's Centenary Year Celebrations, 2018.
- **P. L. Pingale & Prof R. Y. Ghegade felicitated by Indo-Nepal Samarastha Foundation** in Association with Gokhale Education Society, 2017.
- **Prashant L. Pingale received 1<sup>st</sup> prize and Dr. Rupali A. Patil received 3<sup>rd</sup> prize** Oral Presentation at an International conference Innopharm3 at Panjim, Goa. 2018



## 1.3 Statements of the Institution

### 1.3.1 Vision

The College proposes "To excel in pharmaceutical education and technology."

### 1.3.2 Mission

The College adheres and focuses "To provide high quality pharmacy education and training to explore the students to be a responsible professional pharmacist."

### 1.3.3 Objective

It is the objective of the College

- *To produce Pharmacy graduates with strong fundamental concepts and high technical competence in pharmaceutical sciences and technology through skill development programs and add-on courses time to time during their graduation.*
- *To educate students with a strong and well defined concept in the various fields of pharmaceutical sciences including Pharmaceutics, Pharmaceutical chemistry, Pharmacognosy, Pharmacology and Pharmacy Practice according to the requirement of pharmaceutical industries, community and hospital pharmacy.*
- *To develop a sense of teamwork and raising students' knowledge of the value of an interdisciplinary approach to increasing their ability to solve challenging issues in the field of pharmaceutical sciences.*
- *To inspire students to engage in lifelong learning in order to have a highly productive career and to relate the concepts of Pharmaceutical Sciences towards serving the cause of the society.*
- *To establish linkages with senior academicians and industrial resource personnel to make our students more familiar with theoretical concepts and practical ideas through innovative teaching-learning methods.*
- *To promote / train our faculty and non-teaching staff to upgrade their*

*knowledge and skills to impart quality education and related services to our students. Faculties may be promoted to participate in training programme/seminar/workshop/ conference/faculty development program organized on state / national / international level.*

- ⇒ *To develop self-reliant learning habits among students (Assignments/ Seminars / Paper Presentation and instrument / equipment demonstrations during regular academic schedule may be given by the students)."*

## 1.4 Assessment of the Institute

### 1.4.1 Affiliations

The B. Pharm Course is affiliated to **Savitribai Phule Pune University, Pune** with 100 intakes and D. Pharm Course to **Maharashtra State Board of Technical Education (MSBTE), Mumbai** with intake capacity of 60 seats.

### 1.4.2 Certification

- ⇒ The College submits its academic records every year to the **All India Survey of Higher Education (AISHE)** Govt. of India through its registered allocated code which is C- 42134.
- ⇒ The College is an **ISO 9001:2015 Certified Institute**

### 1.4.3 Approvals

The technical courses provided by the College have taken required approvals as follows:

- ⇒ Approved by **All India Council for Technical Education (AICTE), New Delhi.**
- ⇒ Approved by **Pharmacy council of India (PCI), New Delhi.**
- ⇒ Approved by the **Directorate of Technical Education (DTE), Government of Maharashtra.**

### 1.4.4 Accreditation

The **Four Year B. Pharm degree program** is accredited by National Board of Accreditation (NBA), Govt. of India.



## 2. Overview

### 2.1 Summarised Populace analysis for 2022-2023

#### 2.1.1 Students data

The data (shared by the Institute) shows there were a total of **281 male and 366 female students.**

#### 2.1.2 Staff data

S. No.	Type	Male	Female	Total
1	Admin staff	01	03	04
2	Teaching staff	10	17	27
3	Non-Teaching staff	08	09	17
<b>Total Staff Members</b>		<b>19</b>	<b>29</b>	<b>48</b>

*Table 1: Staff data of the Institution for 2022-2023*

The staff data shows the College premises had a total of **48 Staff Members.**

### 2.2 Summarised Populace analysis for 2021-2022

#### 2.2.1 Students data

The data (shared by the Institute) shows there were a total of **261 male and 374 female students.**

#### 2.2.2 Staff data

S. No.	Type	Male	Female	Total
1	Admin staff	01	03	04
2	Teaching staff	10	17	27
3	Non-Teaching staff	08	09	17
<b>Total Staff Members</b>		<b>40</b>	<b>19</b>	<b>48</b>

*Table 2: Staff data of the Institution for 2021-2022*

The staff data shows the College premises had a total of **48 Staff Members.**



## **2.2 Total College Area & College Building Spread Area**

The **total site area is 0.86 acres** and the **total Built-up area of the Institute is 38,857.72 sq. ft.** for an approximately 695 footfalls.

## **2.3 Institute Infrastructure**

### **2.3.1 Establishment**

The Institute was established in **2012**.

### **2.3.2 Spatial Organisation**

There are provisions for staircase for accessibility on the premises, whereas there are amenities such as CCTV, a first aid room, etc. The Institute is located pretty close to nature and hence has a very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building.

## **2.4 Operation and Maintenance of the premises**

The interview session was held with the staff regarding the operation and working hours. The Institution is open from Monday to Saturday from 10:00 hours to 17:00 hours.



## 3. Research

### 3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution sustainable and healthy premises for its inhabitants.

### 3.2 Analysis of the Green Building Study Audit

The procedure included detailed verification as follows:

- Investigation
- Technical discussion with team
- Observations
- Inferences

### 3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

### 3.4 Activities undertaken for the Green Building Study Audit

- Discussion with the Institute
- Allotment and Initiation by the Institute
- Data collection
- Submission of the files



**Evidence documents for Site visit of external audit team**

Audit team headed by external expert - Ar. Nahida Abdulla  
Accredited & Certified Green Building Professional, ISO IA (IMS)  
Audit objective: Green Building up gradation of the premises


Audits covered:  Green audit  Energy audit  Environment audit

Institute: GESS Sir Dr. M.S. Gosavi college of Date: 26 APRIL 2023  
Pharmaceutical Education & Research, Nashik-422005, INDIA

Document objective: Induction Meeting attendance sheet

S. No.	Name	Committee	Designation	Signature
1.	Mrs. F. A. Shaikh	External	Project Coordinator	
2.	Ar. Nahida Abdulla	External	Project Head	
3.	Dr. Sunil V Amrutkar	Internal	Principal	
4.	Dr. Prashant L. Pingale	Internal	IOAC co-ordinator	
5.	Dr. Dattatraya M. Shinde	Internal	MAAC co-ordinator	
6.	Mr. Vishal B. Jadhav	Internal	Asst. Professor	
7.	Mr. Ramesh T. Ghogade	Internal	Asst. Professor	
8.	Mr. Sahelrao S. Boraithe	Internal	Asst. Professor	
9.	Mrs. Anupama S. Paragpe	Internal	Librarian	
10.	Ms. Smriti P. Shelke	Internal	Asst. Professor	
11.	Ms. Savita R. Walimbe	Internal	Asst. Registrar	
12.	Dr. Pramod H. Kerkade	Internal	Professor	
13.	Mr. Sandip R. Purkar	Internal	Asst. Professor	
14.	Mr. Shashikant Jaware	Internal	CLERK	
15.	Mrs. Deepali D. Bhandari	Internal	Asst. Professor	

Signature & round seal  
Name: Dr. S. V. Amrutkar  
Designation: Principal  
For the said Institute



Signature & round seal  
Name: Mrs. F. A. Shaikh  
Designation: Project Coordinator  
For The Greenvio Solutions




**Evidence documents for Site visit of external audit team**

Audit team headed by external expert - Ar. Nahida Abdulla  
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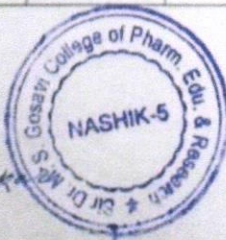
Audits covered:  Green audit  Energy audit  Environment audit

Institute: GES'S Sir Dr. M.S. Gosavi College of Date: 26 APRIL 2023  
Pharmaceutical Education & Research, NASHIK - 422005, INDIA

Document objective: **Exit Meeting attendance sheet**

S. No.	Name	Committee	Designation	Signature
1.	Mrs. F. A. Shaikh	External	Project Coordinator	
2.	Ar. Nahida Abdulla	External	Project Head	
3.	Dr. Sunil V. Amrutkar	Internal	Principal	
4.	Dr. Prashant L. Ningale	Internal	IOAC Coordinator	
5.	Dr. Pramod H. Kattade	Internal	Professor	
6.	Dr. Dattatraya M. Shinde	Internal	MAAC Coordinator	
7.	Mr. Vishal B. Jadhav	Internal	ASST-Professor	
8.	Mrs. Anupama S. Paranjpe	Internal	Librarian	
9.	Mr. Paosahab Y. Ghogade	Internal	ASST-Professor	
10.	Mr. Sahendra S. Borate	Internal	ASST-Professor	
11.	Mr. Smita P. Shelke	Internal	ASST-Professor	
12.	Mr. Sandip R. Purkar	Internal	ASST-Professor	
13.	Mrs. Sarita R. Walimbe	Internal	ASST-Registrar	
14.	Mrs. Deepali D. Bhandari	Internal	ASST-Professor	
15.	Mr. Shaktikant Jambore	Internal	CLERK	

Signature & round seal  
 Name: Dr. S. V. Amrutkar  
 Designation: Principal  
**For the said Institute**



Signature & round seal  
 Name: Mrs. F. A. Shaikh  
 Designation: Project Coordinator  
**For The Greenvio Solutions**





## 4. Investigation

### 4.1 Sources analysis

The primary and secondary sources of energy consumption are based on the electrical supply through the local government.

### 4.2 Energy efficiency analysis

#### 4.2.1 Energy efficient practices for alternative sources

- Additional provisions such as solar hot water heaters, solar parking etc., should be introduced in the near future.
- The premise has LED Lights contribute to 82% in terms of number and **67% of the power requirement** is met through the same. As per our study we could conclude that both of these numbers should improve.

#### 4.2.2 Energy efficient equipment

- The premise has LED Lights in multiple spaces.
- The air conditioners are BEE star labelled appliances and new.
- There are no energy efficient fans in the premises.

## 5. Documentation

### 5.1 Primary sources of energy consumption

- **Electrical (Metered)** – Light, Fans, Equipments, Pumps comprise these sources.
- **Renewable energy** – There are sources to harness solar energy in the premises through solar panels of 10 kW capacities.

### 5.2 Secondary sources of energy consumption

The premise uses batteries, inverters & UPS as backup for administrative purposes.

### 5.3 Actual Electrical Consumption as per Bills

The College spends a substantial amount on electricity bills every month. However, we would like to recommend the use of alternate sources of energy to harness the electrical loads and reduce the monetary expenses.

Sr. No.	Month & Year	Units Consumed	Amount INR
1.	March 2023	5291	43230/-
2.	Feb. 2023	5095	41723/-
3.	January 2023	6053	49484/-
4.	December 2022	5362	43886/-
5.	November 2022	5564	45522/-
6.	October 2022	4784	39203/-
7.	September 2022	5231	42824/-
8.	August 2022	4647	38093/-
9.	July 2022	3885	31920/-
10.	June 2022	4048	33240/-
11.	May 2022	4632	33942/-
12.	April 2022	2921	21568/-
13.	March 2022	2280	17265/-
14.	Feb. 2022	2280	16894/-
15.	January 2022	2280	33415/-

*Table 3: Details of the electrical consumption*

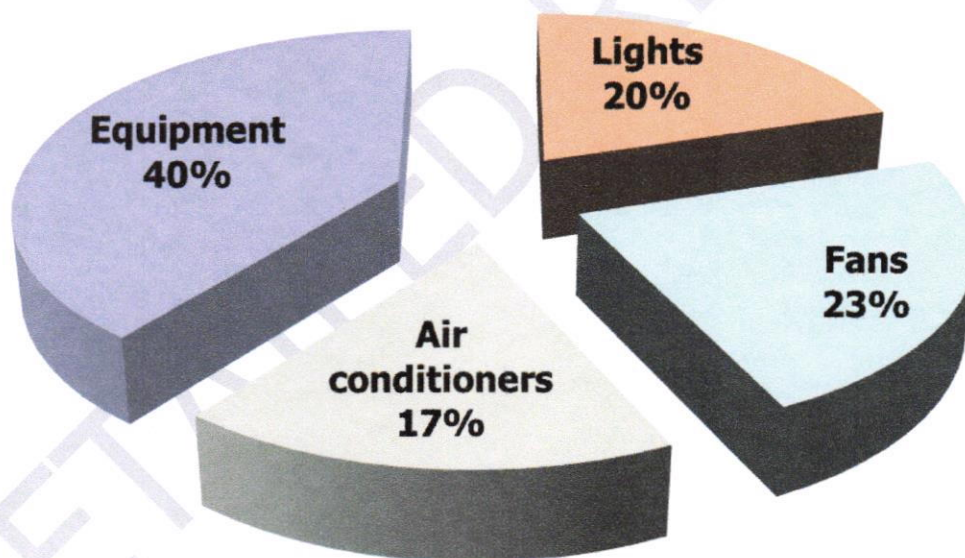


## 5.4 Calculated Electrical Consumption as per inventory

The electricity bills provide actual consumption data. The following is the calculated consumption. It is done to understand the percentage of energy usage in the premises by various applications. It is based on the inventory collected and interviews with the staff.

The additional data such as wattage is taken from market research. In terms of electrical consumption, the main sources are lights, fans, air conditioner, and equipment. The inventory and data collection for sources of energy consumed in the premise in summarised in the following sections.

The following documentation is based on the consumption practice of the premises on a regular working day.



*Figure 1: Summary of the calculated electrical consumption as per inventory*

The above graph shows that equipment consumes 40% whereas the fans consume 23% while the lights consume 20% and the air conditioners consume 17% of the total calculated electrical energy.

## 5.5 Lights

### 5.5.1 Types of lights based on the numbers

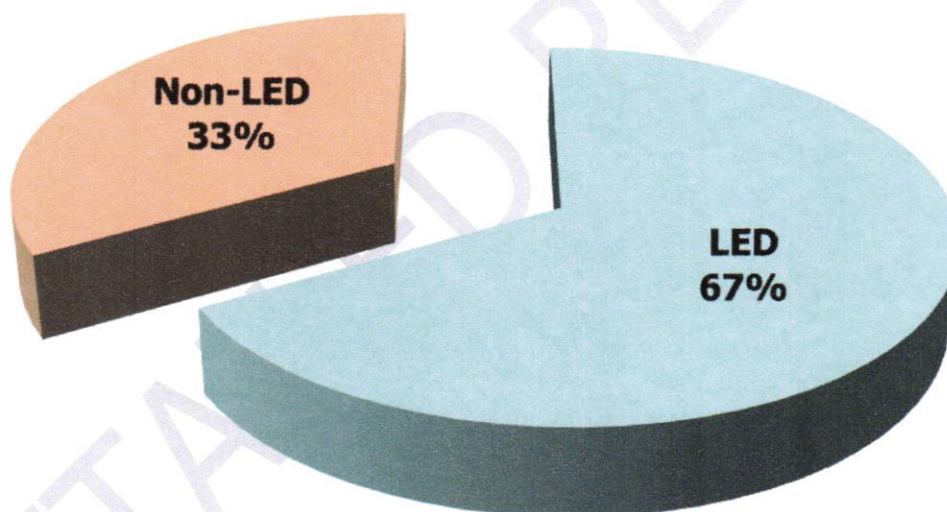
There are a total of **317 nos. of lights on the premises**; the following table shows the various types of lights on the premises.

S. No.	Type	Nos.
1	LED (Energy-efficient lights)	261
2	Non-LED (Non Energy-efficient lights)	56

*Table 4: Summary of the types of lights on-premise*

### 5.5.2 Types of lights based on the power consumption

The energy consumption of lights is **11,283 kWh** of energy.



*Figure 2: Energy consumed by types of lights in the premise based on the usage study*

The analysis of the types of Lights on the premises shows that the **LED lights consume 67%** while the **Non-LED lights consume 33%**



## 5.6 Fans

### 5.6.1 Types of fans based on the numbers

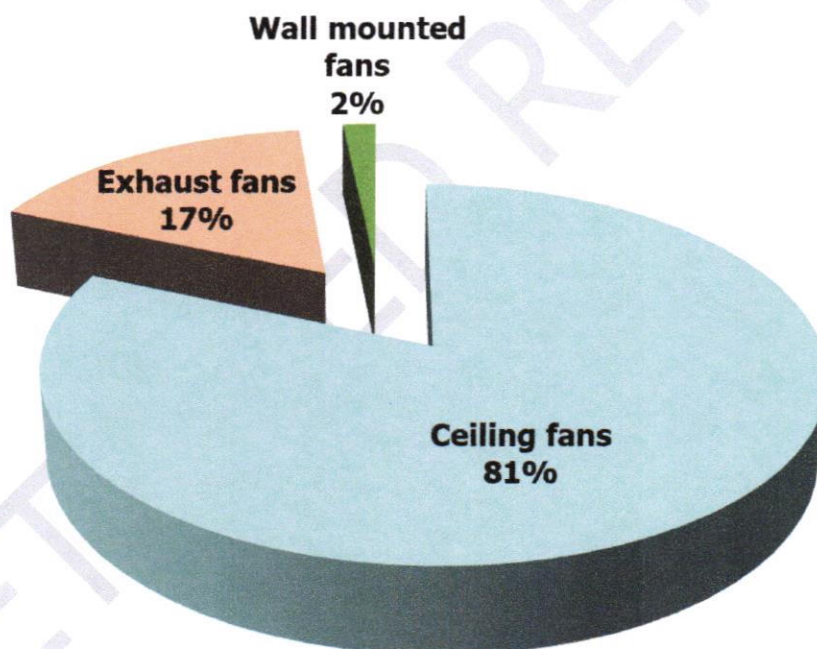
There are a total of **266 fans** on the premises as follows:

S. No.	Type	Nos.
1	Ceiling fans	224
2	Exhaust fans	37
3	Wall mounted fans	5

*Table 5: Summary of the types of fans in the premises*

### 5.6.2 Types of fans based on the power consumption

The energy consumption of fans is **12,862 kWh** of the energy.



*Figure 3: Types of fans based on power consumption*

The above analysis shows the **Ceiling fans consume 81%** whereas the **exhaust fans consume 17%** while the **wall mounted fans consume 2%** of the total power.

### 5.6.3 Inferences

Since the building is oriented climatically and geographically there is fresh air inside the premises and hence there are fewer requirements of fans in the spaces.

## 5.7 Air conditioners

### 5.7.1 Types of air conditioners based on the numbers

There are **8 air conditioners** on the entire premises.

### 5.7.2 Building-wise consumption analysis

The energy consumption of air conditioners is **9,768 kWh** of energy.

### 5.7.3 Site investigation observations

- The maximum consumption is in the Admin department and the seminar hall because the nos. of air conditioners are maximum in this space.
- Nearly equal consumption takes place in the rest of the areas as documented below:
  - Principal office
  - Secretary cabin
  - Aseptic Area
  - Central Inst.

### 5.7.4 About the replacement of current air conditioners

The current air conditioners are well maintained, though there is not an immediate requirement for replacement however, whenever the College undergoes redevelopment there can be provisions for replacement with energy-efficient appliances or new air conditioners that require less power consumption.



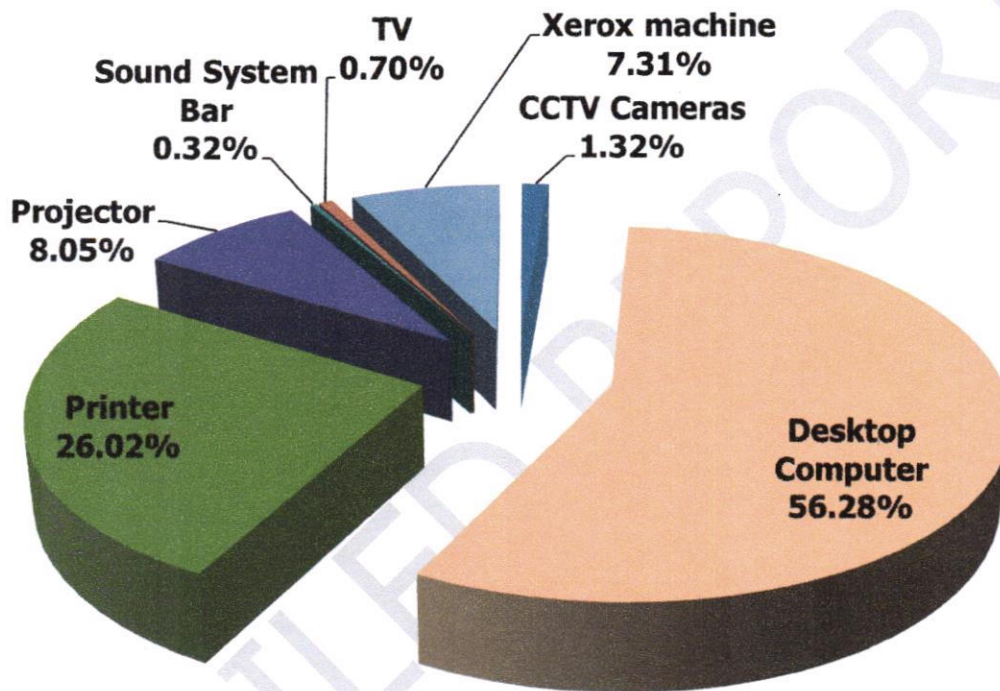
## 5.8 Equipment

### 5.8.1 Types of Equipment

There are **123 nos. of equipment** in the Educational sector.

### 5.8.2 Types of equipment as per their energy contribution

The energy consumption of equipment is **22,164 kWh** of energy.



*Figure 4: Energy consumed by types of equipment in the educational sector based on the usage study*

The above summary shows that the **desktop computers consumes more energy at 56.28%** while the **printer consumes 26.02%** the **projector consumes 8.05%** and the **Xerox machine consumes 7.31%** these are the maximum consumers as compared to other equipment.

## 6. Suggestion

### 6.1 Section-wise suggestions

The following suggestions are to be considered as a **first priority** for implementation. These **should be executed within the next 1.5 to 2.5 years from the date of the Report submission.** The Institute can execute a plan after discussion with Project Head.

#### 6.1.1 Electromechanical systems - Electrical and Lighting

##### Section 1 - Non-LED lights

The current light analysis shows that Non-LED lights consume anywhere between 50W to 54W and even more when in use; these should be replaced with LED lights which consume on an average 12-16W when in use. Our technical analysis shows that there would be a reduction of an average of **67% reduction** in energy consumption through lights specifically as a part of the electro -mechanical system if all **Non-LED lights on all floors** are replaced with an energy efficient appliance whenever the College undergoes renovation.

##### Section 2 - Ceiling fans

The current Fans are in proper working conditions and maintained well. The ceiling fans are in more quantity and consume at least 45W when in use. These should be replaced with energy efficient fans consuming 14W when in use. Our detailed study states that is all the **ceiling fans on all floors** if replaced with star rated appliance results in a reduction of average of **69% reduction** in energy consumption if replaced with energy efficient appliance. It will be suggested to either replace these now if College can have certain plans else the replacement can be done when fans get damaged or are not in working condition.



## 6.2 General suggestions

The following details are consolidated study recommendations related to 'entire Institute' and should be considered as **second priority** for implementation, once the section wise recommendations are implemented. The following recommendations should be ***implemented within 2.5 to 3.5 years from the date of the Report submission.***

### 6.1.1 Alternatives to increase renewable energy – Solar farms

This option can be explored with due discussion with the surrounding and adjacent farmland owners. This will serve as a noble project and will provide dual benefits to farm land and University w.r.t to electricity bill power reduction.



**Plate 1: Solar farm concept for the Institute (For reference purpose only)**

Image source: Zsuzsa Bóka from Pixabay

### 6.2.2 Alternatives to increase renewable energy – Solar parking

The College can turn its existing parking areas into solar panel powered parking areas. This will provide shade and renewable energy benefit to the College.



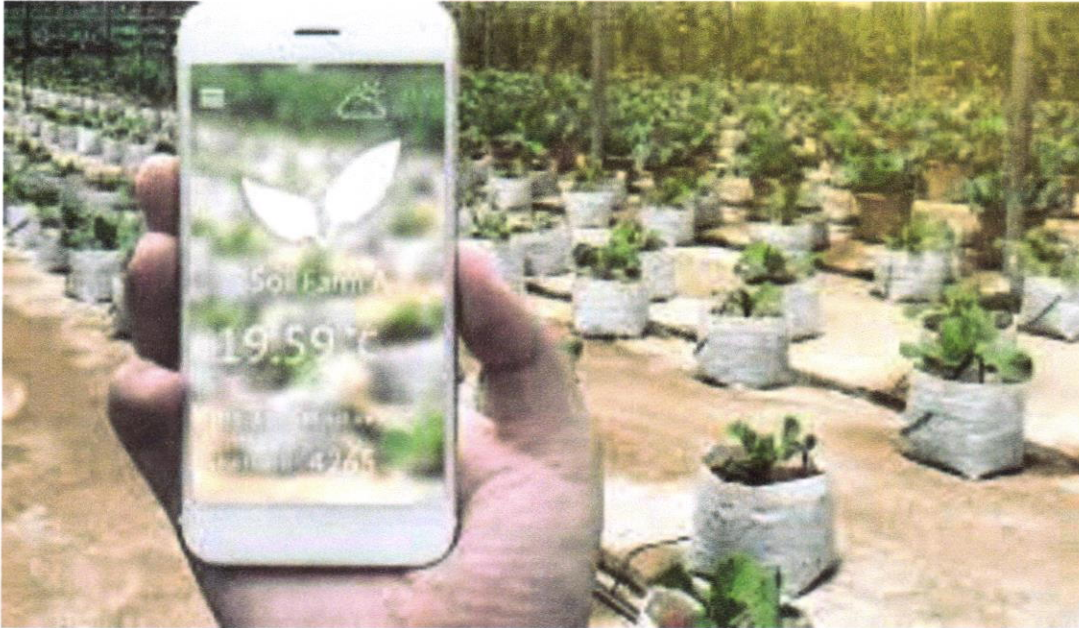
**Plate 2: Solar parking concept for the Institute (For reference purpose only)**

Source: Image by <https://solarpowerproject.in/solar-panels-for-parking-lots.php>



### 6.2.3 Alternatives towards Smart premises – Smart gardening

The College can undertake a Smart Gardening system using IoT Technology. This will result in saving time by scheduling time for watering; saving money through automated water schedules tracking dampness of soil to know when, how much water garden needs.



*Plate 3: Solar farm concept for the Institute (For reference purpose only)*

*Image source: <https://housing.com/news/smart-gardening/>*

*Data source: <https://www.happysprout.com/inspiration/what-is-smart-gardening/>*

DETAILED



**On-site investigation and physical verification**  
 Audit Team during the visit and other photos collected during data documentation



Meeting with the core team, group photo with the team and tree plantation



Investigative parameters – Ecological Management – Wheelchair, Ramp and Plantations



Investigative parameters – Energy Management – Solar panels and electrical appliances



Investigative parameters – Water & Waste Management – Water tanks, rain water harvesting pits & vending machine



## 7. References

The study is based on the data collected, analyzed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyze and study the data collected.

### Specific references for study related to energy

- <https://www.energy.gov/eere/buildings/zero-energy-buildings>
- <https://www.dsaarch.com/zero-net-positive-energy>
- U.S. Energy Information Administration
- <https://www.happysprout.com/inspiration/what-is-smart-gardening/>
- <https://housing.com/news/smart-gardening/>
- Inference study reference image - Zsuzsa Bóka from Pixabay
- Inference study reference image - <https://solarpowerproject.in/solar-panels-for-parking-lots.php>



