



Bharatiya Shikshan Prasarak Sanstha, Ambajogai



Swa. Sawarkar Mahavidyalaya, Beed



Internal Quality Assurance Cell

Criteria 7: Institutional Values and Best Practices

Key Indicator 7.1: Institutional Values and Social Responsibilities

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

2.ENERGY AUDIT

ENERGY AUDIT

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

Sustainability study
AUDIT REPORT

Studied for
Bhartya Shikshan Prasarak Sanstha's
Swa. Sawarkar Mahavidyalaya
Sawarkar Nagar, Jalna Road,
Beed-431122 Maharashtra

Studied in the capacity of
Accredited and Certified
Green Building Professional



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

Email: greenviosolutions@gmail.com

Valid till **July 2024**



Disclaimer

The Audit Team has prepared this report for the **Bhartya Shikshan Prasarak Sanstha's Swa. Sawarkar Mahavidyalaya** located at Sawarkar Nagar, Jalna Road, Beed-431122 Maharashtra based on input data submitted by the Institute 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 Institute. 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

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Acknowledgement

The Audit Assessment Team thanks the **Bhartya Shikshan Prasarak Sanstha's Swa. Sawarkar Mahavidyalaya, Maharashtra** for assigning this important work of Energy Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are extended are due to **Hon. Dr. Surindra Govindrao Alurkar**, (President); **Hon. Shri. Jitesh Dullabhdas Chapasi**, (Vice President); **Hon. Dr. Hemant Vasantrao Vaidya**, (Secretary); **Hon. Shri. Satyanarayan Chaganlalji Lohiya**, (Treasurer) and **everyone from the Management**.

Our heartfelt thanks are extended to the Chairperson of the entire process **Prof. Dr. Priti Diliprao Pohekar** (Principal) for the valuable inputs.

We are also thankful to Institute's Task force who have played a major role in data collection **Prof. Dr. Rajesh Marotirao Dhere** (*Special mention for the excellent coordination*).

Professor **Mr. Tahir Mansuri**; Non-teaching staff member **Mr. Patil** and admin staff member **Mr. Patil (OS)**.

We highly appreciate the assistance of 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


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1. Introduction

1.1 About the statements of the Institute

1.1.1 Mission

The Institute focuses "Nation building through man making and character building."

1.1.2 Objectives

The objective of the Institute is:

- "To make available various courses at UG and PG level for the students.
- To equip the students by providing knowledge and required skills for global competency.
- To arrange various activities to inculcate moral values among the students.
- To create healthy atmosphere and provide facilities for all round personality development of the students.
- To foster global competencies among students.
- To bring awareness about the modern technology.

1.2 Assessment of the Institute

1.2.1 Affiliations

The Institute is affiliated to **Dr. Babasaheb Ambedkar Marathwada University**, a state University in the city of Aurangabad, State of Maharashtra in India.


1.2.2 Certification

The Institute has received the following Certifications

- **AISHE** – The All India Survey of Higher Education code is **C-34668**.
- **ISO 9001** – Quality Management Systems

1.2.3 Recognitions

The Institute is recognised in **section 2(f) and section 12 (B) of the University Grants Council Act, 1956** Govt. of India, New Delhi.


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2. Overview

2.1 Summarised Populace analysis (Academic year 2)

2.1.1 Students data

The data (shared by the Institute) shows there were a total of **559 male and 326 female students.**

2.1.2 Staff data

S. No.	Type	Male	Female	Total
1	Teaching staff	28	07	35
2	Non-Teaching staff	16	03	19
Total Staff Members		44	10	54

Table 1: Staff data of the Institution for (Academic year 2)

The staff data shows the Institute premises had a total of **54 Staff Members.**

2.2 Summarised Populace analysis (Academic year 1)

2.2.1 Students data

The data (shared by the Institute) shows there were a total of **139 male and 36 female students.**

2.2.2 Staff data

S. No.	Type	Male	Female	Total
1	Teaching staff	27	07	34
2	Non-Teaching staff	16	02	18
Total Staff Members		43	09	52

Table 2: Staff data of the Institution for (Academic year 1)

The staff data shows the Institute premises had a total of **52 Staff Members.**


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2.3 Site area & institute building spread area

The site area is 1.59 acres and the Built-up area is 26,323 sq. ft. for an approximately 939 footfalls.

2.4 Institute Infrastructure

2.4.1 Establishment

The Institute was established in the year 1995.

2.4.2 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.


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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

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4. Documentation

The premise uses following sources of energy consumption.

4.1 Primary sources of energy consumption

- **Electrical (Metered)** – Light, Fans, Equipments, Pumps comprise these sources.
- **Alternate sources of energy** – There are sources available in the premises as documented below:

S. No.	Name
1	Solar panels

Table 3: Details of the alternate sources of energy

4.2 Secondary sources of energy consumption


The premise uses batteries, inverters & UPS as backup for administrative purposes. The details of the existing sources are documented below:

S. No.	Name	Nos.
1	UPS	3
2	Inverters	
3	Batteries	6

Table 4: Details of secondary sources of energy consumption

4.3 Actual electrical consumption as per bills

The Institute has rooftop solar panels, 50-60% of the energy required is consumed by the installed sources. This is a good practice.


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4.4 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 is summarised in the following sections.

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

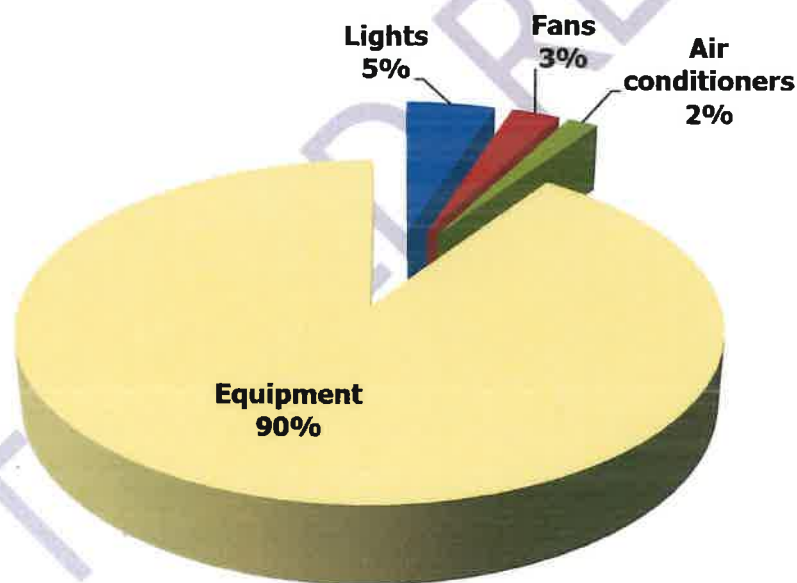


Figure 1: Summary of the calculated electrical consumption as per inventory

The above graph shows that equipment consumes 90% whereas the lights consume 5% while the fans consume 3% and air conditioners consume 2% of the total calculated electrical energy.


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4.5 Lights

4.5.1 Types of lights based on the numbers

There are a total of **119 nos. of lights on the premises**; the following table shows the various types of lights on the premises.

S. No.	Type	Nos.
1	LED lights (Energy efficient appliance)	53
2	CFL lights (Non-Energy efficient appliance)	2
3	Non-LED lights (Non-Energy efficient appliance)	64

Table 5: Summary of the types of lights on-premise

4.5.2 Types of lights based on the power consumption

The energy consumption of lights is **6,046 kWh** of energy.

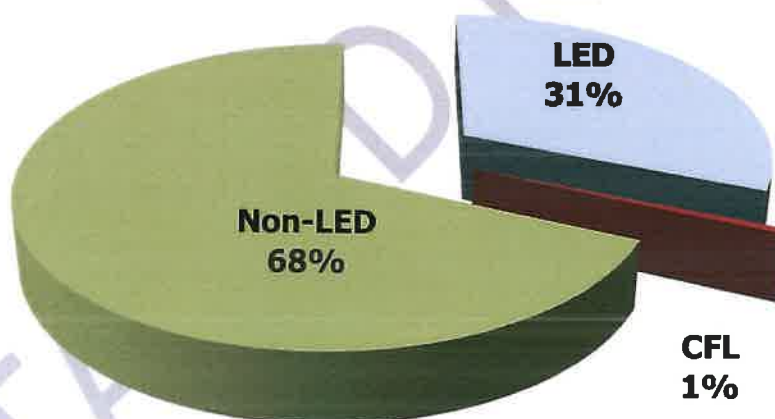


Figure 2: Energy consumed by types of lights in the premise based on the usage study

The analysis of the types of Lights on-premises shows **Non-LED lights consume 68%** whereas the **LED lights consume 31%** and **CFL lights consume 1%** of the total power consumed by lights.



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4.6 Fans

4.6.1 Types of fans based on the numbers

There are a total of **70 ceiling fans** on the premises as follows:

4.6.2 Types of fans based on the power consumption

The energy consumption of ceiling fans is **3,308 kWh** that is 100% of the total power consumed by ceiling fans.

4.7 Air conditioners

4.7.1 Types of air conditioners based on the numbers

There are **3 nos. of air conditioners** on the entire premises.

4.7.2 Building-wise consumption analysis

The energy consumption of air conditioners is **2,081 kWh** of energy.

4.7.3 About the replacement of current air conditioners

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

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4.8 Equipment

4.8.1 Types of Equipment

There are **115 nos. of equipment** in the Educational sector.

4.8.2 Types of equipment as per their energy contribution

The energy consumption of equipment is **1,10,084 kWh** of energy.

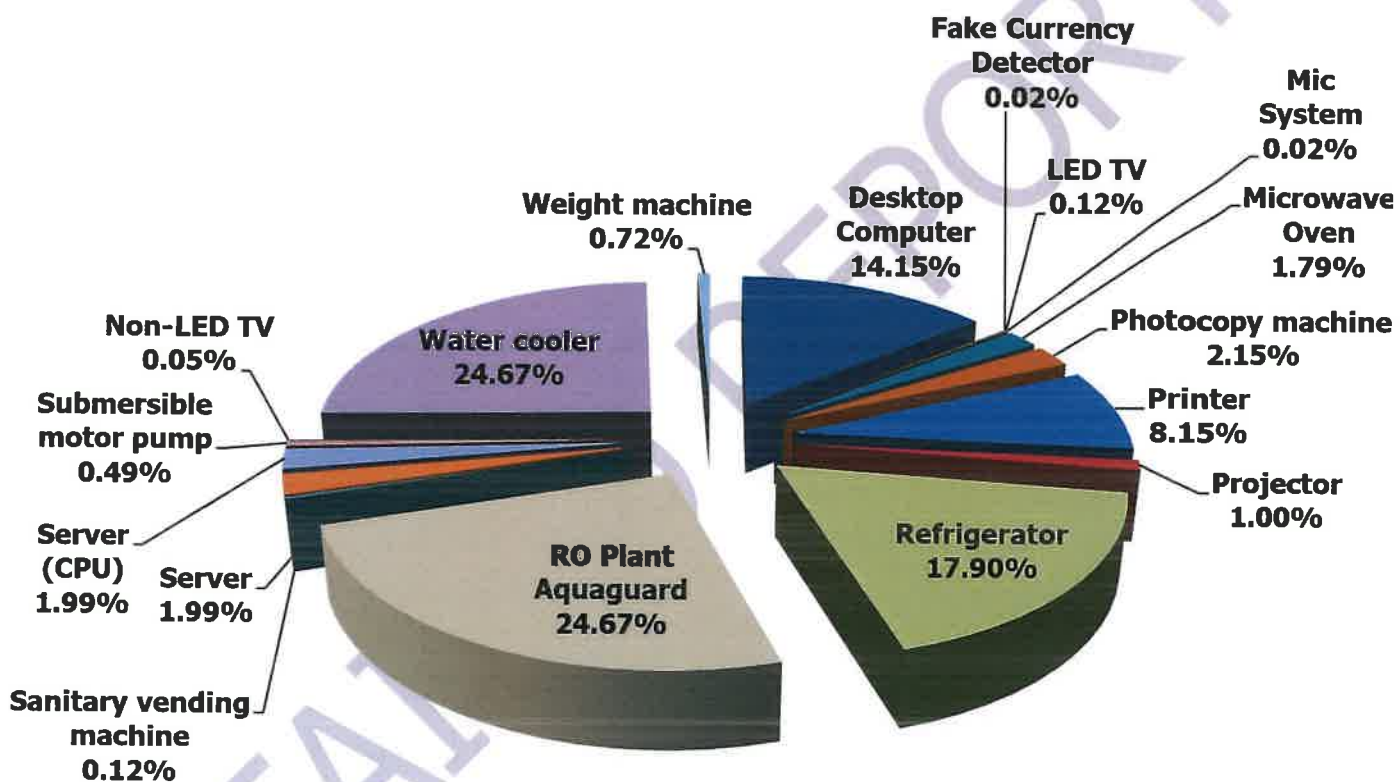



Figure 3: Energy consumed by types of equipment in the educational sector based on the usage study

The above summary shows that the **RO plant Aquaguard and water cooler consumes more energy at 24.67% each** while the **refrigerator consumes 17.90%** the **desktop computer consumes 14.15%** and the **printer consumes 8.15%** these are the maximum consumers as compared to other equipment.


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5. Suggestion

5.1 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.

5.1.1 Electromechanical systems - Electrical and Lighting

Section 1 – CFL & Non-LED lights

The current light analysis shows that CFL/ Non-LED lights consume anywhere more energy when in use; these should be replaced with LED lights which consume on an average 12-16W when in use.

Our technical research shows that there would be a reduction of an average of **30-40% reduction** in energy consumption through lights specifically as a part of the electro - mechanical system if all **CFL/ Non-LED lights** are replaced with an energy efficient appliance whenever the Institute 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 technical research 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 Institute can have certain plans else the replacement can be done when fans get damaged or are not in working condition.


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5.2 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.**

5.2.1 Alternatives to increase renewable energy

5.2.1.1 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 Institute 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

5.2.2 Alternatives towards Smart premises – General aspects

- ⇒ **Laboratories spaces (Equipment)** - Use of Microwave synthesizers, Ultrasonic bath and ultrasonic probe to minimize consumption of electricity for research work and practical.
- ⇒ **Building system spaces (Energy conservation connected via bluetooth)** – Use of Sensor Based air conditioners in required areas.


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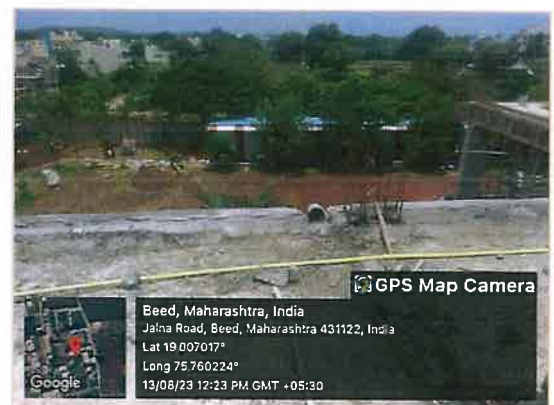
Investigation
Evidences collected during data documentation



Investigative parameters – Energy Management – Solar panels in the premises



Investigative parameters – Ecological Management – Green cover and universally accessible premises



Investigative parameters – Water Management – Water sources and rain water harvesting system



Investigative parameters – Waste Management through compost pit and waste water treatment



6. Compilation

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>

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GV/EA/08-23/203

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)

Bhartya Shikshan Prasarak Sanstha's

Swa. Sawarkar Mahavidyalaya

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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.

Valid till **31 July 2024**

Ar. Nahida Abdulla Shaikh

"Elite 100 Green Architects of India" Eonaur, 2022

Registered Architect, P.G.D.R.D, ISO Certified I. A. (IMS)

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