

# ENERGY AUDIT

STUDY PERIOD (THREE YEARS) 2021 – 2022; 2022 – 2023 & 2023-2024

## Sustainability study RENEWAL AUDIT REPORT

**Studied for**  
Viswambhara Educational Society's  
**Vaagdevi College of Engineering**  
**(Autonomous)**

Bollikunta (Village), Khila Warangal (Mandal),  
Warangal (Dist.) - 506 005, Telangana

**Studied in the capacity of**

**Accredited and Certified**  
Green Building Professional



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Valid till **31 January 2025**

# Disclaimer

The Audit Team has prepared this report for the **Viswambhara Educational Society's Vaagdevi College of Engineering (Autonomous)** located at Bollikunta (Village), Khila Warangal (Mandal), Warangal (Dist.) - 506 005, Telangana 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 a 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 while 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 an Accredited and Certified Green Building Professional. 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 incapacity of an Accredited & Certified Green Building Professional with extensive experience.

*Nahida Shaikh*  
**Ar. Nahida Abdulla**  
**Greenvio Solutions**

*Developing Healthy and Sustainable Environments*

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## Acknowledgment

The Audit Assessment Team thanks the **Viswambhara Educational Society's Vaagdevi College of Engineering (Autonomous, Telangana)** 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 **Prof. K. Prakash**, (Principal).

We are also thankful for **Institute Taskforce** who have collected the data required – Prof. **K. Thirupathi Rao**, Vice-Principal; **Dr. U. Kiran**, IQAC Coordinator and **Mr. Y. Srinivas**, Assistant Registrar

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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RENEWAL REPORT

# 1. Introduction

## 1.1 About the functioning of the Institution

Vaagdevi College of Engineering is an AICTE approved autonomous college, putting significant efforts to help students with internship opportunities. It is fully equipped with lecture theatres, purpose-built labs and learning areas, cafes, recreation areas, libraries, transport provisions with a fleet of college buses and separate hostels for boys and girls with a range of services and facilities.

## 1.2 Statements of the Institution

### Vision

- *Striving Continuously for Global Recognition through Academic Excellence in Higher Education for the Betterment of Society*

### Mission

- *To produce technically competent and socially responsible engineers with ethical values through innovative teaching learning process*
- *To promote research and entrepreneurship culture among faculty and students*

## 1.3 Populace analysis

### 1.3.1 Students and staff data (Academic year 2021-2022)

The premises had **3,130** male and **1,522** female stakeholders.

### 1.3.2 Students and staff data (Academic year 2022-2023)

The premises had **3,155** male and **1,608** female stakeholders.

### 1.3.2 Students and staff data (Academic year 2023-2024)

The premises had **3,167** male and **1,768** female stakeholders.

## 2. Compliance

The compliance study was carried out through investigative ways. This was done to understand the **extent of suggestions and their implementations based on previous report of Academic years 2019-2020 and 2020-2021**. The renewal is for academic years 2021-2022, 2022-2023 and 2023-2024.

### 2.1 Compliance status

The details of compliance state that no change has been implemented.

### 2.2 Compliance comparative study

The information for the existing nos. of electrical appliances and their power consumption is documented below.

#### ➤ Lights – Source of electrical usage

- The current data shows there are **1,230 nos. of LED lights contributing to 35,977 kWh of energy**.
- The previous data shows there were **1,234 nos. of LED lights**, thus, there has been a **reduction of 4 nos. of lights**
- Since the appliances used are LED, there are no changes required for this section and the current practices can be continued

#### ➤ Fans – Source of electrical usage

- The data is documented as follows:

S. No.	Type	Previous nos.	Current nos.
1	Wall mounted fan	39	39
2	Table Fan	11	11
3	Small motor Exhaust fan	6	6
4	Large Motor exhaust fan	1	0
5	Regular ceiling fans	743	743

*Table 1: Details of the fans in premises*

- **As per the above analysis there were 800 fans previously and there are 799 fans at present, there is only a decrease in one large motor exhaust fan.**
  - **Thereby, reducing the 63,742 kWh energy to 63,085 kWh**
  - Since the total numbers of regular ceiling fans are extensive bulk replacement is not recommended. Whenever the appliances are not in working conditions they are suggested to be replaced with energy efficient fans.
- ➔ **Air conditioners – Source of electrical usage**
- Previously there were **91 nos. and currently there are 91 nos. of air conditioners in the premises.**
  - There has been no increase in the numbers thus the energy consumption remains the same **contributing to 8,16,640 kWh of energy**

## 2.3 Compliance technical study

As per investigation of the systems, we confirm the availability of the following features:

### 2.2.1 Solar panels

There are 460 nos. of solar panels generating up to 150KWP.

### 2.2.2 Other renewable energy sources

The other sources of energy consumption such as solar tree, solar hot water heaters, solar car, Solar parking, Solar pumps, Solar street lights, Wind mills and IoT mechanism are 'NOT' available in the premises.

### 2.2.2 Power backup sources

S. No.	Block Name	KVA	Quantity
1	Block A	220	1
2	Block B	500	1
3	Block Mechanical	100	1

*Table 2: Power Backup (Transformer)*

S. No.	Block Name	KWP
1	Block B	150

*Table 3: Power Backup (Solar)*



*Plate 1: Solar PV Panels on roof top and Solar PV inverters*

The internal team has shared the following data.

Month	Total Consumption		KVA		TOD1	TOD2	Amount in INR
	KWH	KVAH	Billed	Recorded			
<b>Mar-22</b>	14,386	16,120	304	131	1,417	4,617	60,444.13
<b>Apr-22</b>	10,438	12,108	304	131	448	4,137	1,49,084.13
<b>May-22</b>	8,722	10,336	304	52	394	3,490	1,77,746.13
<b>Jun-22</b>	8,575	8,943	304	38	392	2,456	1,77,869.13
<b>Jul-22</b>	13,271	14,606	304	119	781	3,310	1,78,737.13
<b>Aug-22</b>	21,573	24,947	304	205	1,957	4,301	1,44,834.00
<b>Sep-22</b>	19,474	24,085	304	254	1,475	4,849	1,12,331.00
<b>Oct-22</b>	15,001	17,831	304	178	739	4,545	55,556.00
<b>Jan-23</b>	11,315	12,319	304	69	1,137	3,723	1,79,365.17



<b>Feb-23</b>	11,426	12,590	304	78	1,032	4,346	1,79,922.17
<b>Mar-23</b>	13,199	15,234	304	108	1,006	4,760	1,79,502.17
<b>Apr-23</b>	27,439	31,743	304	191	1,848	5,787	2,53,816.17
<b>May-23</b>	31,552	39,267	304	264	2,679	5,163	4,36,744.17
<b>Jun-23</b>	36,290	43,724	304	252	2,736	5,573	4,84,508.17
<b>Jul-23</b>	10,438	12,108	304	131	448	4,137	1,49,084.13
<b>Aug-23</b>	19,474	24,085	304	254	1,475	4,849	1,12,331.00
<b>Sep-23</b>	11,315	12,319	304	69	1,137	3,723	1,79,365.17
<b>Oct-23</b>	13,199	15,234	304	108	1,006	4,760	1,79,502.17
<b>Nov-23</b>	13,271	14,606	304	119	781	3,310	1,78,737.13
<b>Dec-23</b>	8,722	10,336	304	52	394	3,490	1,77,746.13
<b>Jan-24</b>	11,426	12,590	304	78	1,032	4,346	1,79,922.17

*Table 4: Electrical unit consumption study*

**The observation related to above information states:**

- ⇒ The **total amount** spent in past twenty-one months is **Rs. 39,27,147.57 /-**
- ⇒ The **average amount** spent every month are **Rs. 1,87,007/-**
- ⇒ The **total units** consumed in past twenty-one months is **~ 3,30,506 units**
- ⇒ The **average units** consumed every month are **~15,738 units**
- ⇒ **The energy from solar is given back to the grid**

## 3. Inferences

### Entire site recommendations

The following suggestions can be implemented ***in next two years***. The Institute can execute a plan after discussion with Project Head.

#### 3.1 Replacement of non-energy efficient appliance

- Regular ceiling fans with energy efficient appliances
- Reduce nos. of air conditioners

#### 3.2 Alternatives to increase renewable energy

##### 3.2.1 Solar tree

Since there is availability of space; the solar trees can be installed in multiple places as they will provide dual benefits of aesthetic and energy reduction.



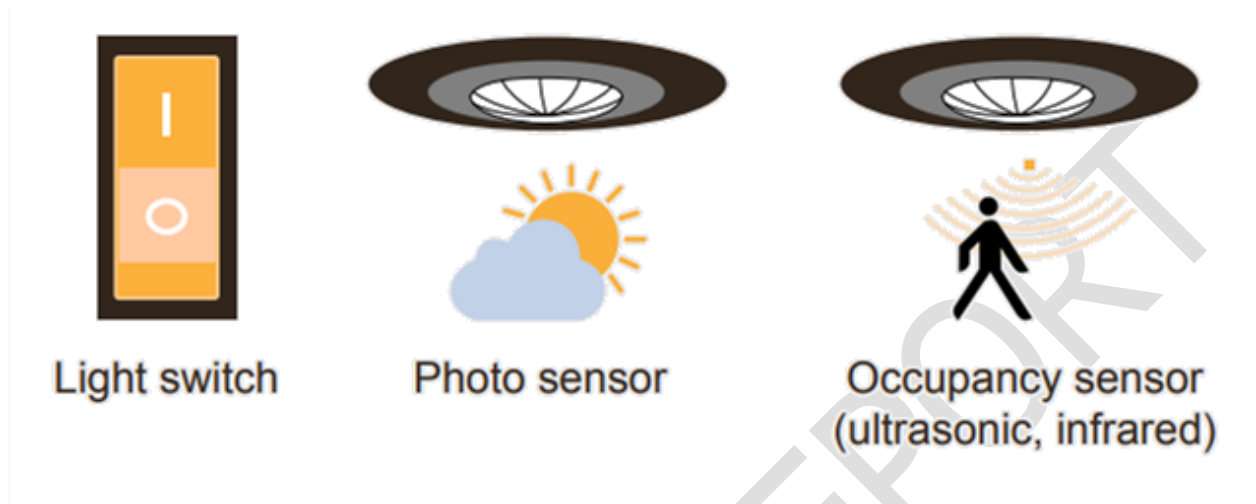
***Plate 2: Solar tree concept for the Institute (For reference purpose only)***

Source: Image by <https://timesofindia.indiatimes.com/india/cmeri-installed-the-worlds-largest-solar-tree-at-durgapur/articleshow/77856790.cms>

### 3.3 Alternatives towards Smart premises mechanisms

#### 3.3.1 Facility management systems, controls

(Includes electromechanical systems – Electrical, Water)



*Plate 3: Understanding the lighting concepts*

Source: [https://seors.unfccc.int/applications/seors/attachments/get\\_attachment?code=NG125PFE4WHMWSYAK8TCAKIHMWX0F4QD](https://seors.unfccc.int/applications/seors/attachments/get_attachment?code=NG125PFE4WHMWSYAK8TCAKIHMWX0F4QD)

#### 3.3.2 Smart gardening

The Institute 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 4: 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/>

## 4. Compilation

The study is based on the data collected, analysed, 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 analyse 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://ieeexplore.ieee.org/document/6779316>
- ➔ <https://www.murata.com/en-global/apps/industry/security/entranceandexitsystem>
- ➔ <https://www.energuide.be/en/questions-answers/what-are-the-alternatives-to-air-conditioning/2121/>

