Shri Swami Vivekanand Shikshan Sanstha , Kolhapur

(Affiliated To Shivaji University, Kolhapur)

Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahividyalaya Tasgaon

---

6.2.1

DOCUMENTS UPLOAD

Sr. No.	Documents
1.	Strategic Plan
2.	Energy and Green Audit Report

Shri Swami Vivekanand Shikahan Sanstha's

Sasnthamata Sushiladevi Salunkhe Mahila Shikahanshastra Mahavidyalaya,

Tasgaon

YEARLY STRATEGIC PLAN

Academic year 2022-23

Objectives	Areas to do Better
Objective 1- to enhance Teaching Learning process	All Teachers to upgrade the knowledge by attending training/ webinars/ TET,CTET,TAIT workshop
Objective2- to upgrade of infrastructure of college, office and library	Infrastructural development, renovation of infrastructure, new ICT equipment connections. , increase in laboratory equipment and Library resources.
Objective3-to take more green initiatives	Vermicomposting, waste water management
Objective 4-to develop green campus	Fully up gradation of Solar System and campus beautification. Waste water management
Objective 5-to provide placements to alumni	To arrange campus interview for alumni students.
Objective 6- to do MOU with international institutions, Agriculture Department	MOU with international school, Agriculture department of Tasgaon
Objective 7- to participate and win competition of Annual Magazine conducted by Shivaji University,Kolhapur	To collect quality articles from the student teachers, to encourage and guide them for creative writing.

Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya Sanchalit
Tasgaon, Dist. Sangli. Pin. 416 312

I/c Principal,
Sansthamata Sushiladevi Salunkhe
Mahila Shikshanshastra Mahavidyala,
Tasgaon, Dist. Sangli. Pin. 416 312.

ENERGY AND GREEN

Audit Report

2022-23

Accredited By NAAC-"B"

Submitted to
Internal Quality Assurance Cell (IQAC)

21 March 2023

Company Name:
D S Energy Consultancy and Services, Sangli
Authored by:
Mrs. D. S. Patil (BEE Certified Energy Auditor)

Acknowledgement

Energy and Green Audit Assessment Team thanks the management of **Shri Swami Vivekanand Shikshan Sanstha, Kolhapur** **Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon** for assigning this important work of Energy and Green Audit to DS Energy Consultancy and services, Sangli. We appreciate the cooperation to our Team for completion of study.

Our special thanks are to Principle of college Dr. B.M. Patil, Head of IQAC Dr. A.S. Chikhalikar all head of the departments, teaching and non- teaching staff for giving us necessary inputs to carry out this very vital exercise of Energy Audit and Green audit.

We are also thankful to other staff and office members who were actively involved while collecting the data and conducting field measurements.

Disclaimer

Energy and Green Audit Team has prepared this report for **Shri Swami Vivekanand Shikshan Sanstha, Kolhapur Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon** on based on input data submitted by the representatives of College complemented with the best judgment capacity of the expert team.

While all reasonable care has been taken in its preparation, details contained in this report have been complied in good faith based on information gathered.

It is further informed that the calculations are arrived flowing best estimates and no representation, warranty or undertaking, express 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.

Prepared by:

Prof. D. S. Patil

M.Tech (Energy Technology), B.E.(Mech)

Bureau of Energy Efficiency certified Energy Auditor No: EA 31840

Energy and Green Audit Completion Certificate

This is to certify that a detailed Energy and Green Audit for Sansthamata Sushiladevi Salunkhe Mahila Shikshan shastra Mahavidyalaya, Tasgaon has been conducted for the year 2022-23 to assess the green initiative planning, efforts, activities implemented in the campus like Rainwater harvesting, Solar energy Usage, Swach Bharat Abhiyaan, waste water management, recycle of waste etc.

The activities and measures carried out by the institute have been verified and found to be satisfactory. The efforts taken by the institute, faculty and students are highly commendable.

Name of the Institution	Sansthamata Sushiladevi Salunkhe Mahila Shikshan shastra Mahavidyalaya, Tasgaon
Details of facilities audited	All departments , Laboratories , Library , etc
Date of Energy and Green audit	March 2023
Name of Certified Energy Auditor	Prof. Dhanashri. S. Patil
Certificate no:	EA 31840

Prof. D. S. Patil

M.Tech (Energy Technology), B.E.(Mech)

Bureau of Energy Efficiency certified Energy Auditor No: EA 31840

Table of Contents

1. Executive Summery

The rapid urbanization and economic development at local,regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the green campus for the institute which will lead for sustainable development. In accordance with the Green Campus Evaluation Plan, as suggested by the Internal Quality Assessment Cell (IQAC) of the college **Shri Swami Vivekanand Shikshan Sanstha, Kolhapur Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon** planned for conducting a energy an green audit of the college in December, 2022. After the field work and other formalities, the report was finally sent for approval to the authority (Principal and IQAC) in March 2023.

The purpose of the audit was to make sure that the practices followed in the campus are healthy and environment friendly. With this in mind, the specific objectives of the audit were to evaluate the degree to which the Departments are in compliance with the applicable regulations, policies and standards and to ensure that the development of the college aims at sustainable development and green campus. It works on several facts of green campus including water conservation, Electricity conservation, Tree plantation, Waste management, paperless work, Mapping of biodiversity. The methodology used included physical inspection of the campus and review of the relevant documentation. It can make tremendous impact on students' health and learning, college operational cost and the environment.

The objective of the audit was to study the energy consumption pattern of the facility, identify the areas where potential for energy/cost saving exists and prepare proposals for energy/cost saving along with investment and payback periods.

The salient observations and recommendations are given below.

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon uses energy in the following forms:

Electricity from MSEDCL

Electrical energy is used for various applications, like Computers, Lighting, Air- Conditioning, Fans, Other Lab Equipment

The average energy consumption is around 280 kWh/Month.

The Specific Energy Consumption (SEC) is the ratio of energy required per square meter. In this case the SEC is evaluated as electrical units consumed per square meter of area. It is calculated as under: For Electricity: 0.199008 kWh/Sq m

It has found that there is wide scope for energy saving and pollution free campus development. Recommendations with cost benefit analysis have given in detail in report.

Total potential for energy saving within all campus is approximately **Rs. 0.60+**Lakh per annum.

2. Abbreviations

AHU - Air handling unit

APFC - Automatic Power Factor Controller

DG -Diesel generator

ECP -Energy Conservation Proposal

GCV -Gross Calorific Value

HVAC - Heating, Ventilation and Air Conditioning

HSD -High speed diesel

kCal -Kilo-calories

FO -Furnace oil

PF -Power Factor

SEC - Specific Energy Consumption

TR -Tons of Refrigeration

UOM - Unit of Measurement

MAHADISCO -Maharashtra State Electricity Distribution Company

3. Introduction

3.1 Introduction of Institute

Sr No.	Particulars	Details
1	Name of the Institutes	**Shri Swami Vivekanand Shikshan Sanstha, Kolhapur** **Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon**
2	Address	Kalgaonkar Wada, Tasgaon 416312, Maharashtra India.
3	Year of Establishment	1984
4	Courses offered	B.Ed. (2 years program)
5	Affiliation	NAAC (B Grade) affiliated by the Shivaji University
6	Total current students	90
7	Total teaching staff	6
8	Non-teaching staff	3

Energy Audit assessment team	**Designation**
Prof.Mrs. D.S.Patil	Certified Energy Auditor
Dr. B.M. Patil	Principal
Dr. A.S.Chikhalikar	IQAC coordinator

Physical Structure

Total College campus Area	925.50 sq.m
Build up Area	1408.82 sq.m

3.2 Introduction to Energy Audit

An energy audit is a process to study of a building or industry to know the energy consumption of the building and identify methods to reduce the energy consumption for energy savings. In Commercial Building, the present electrical consumption is about 8-10 percent of the total electricity. To meet the international level comfort and facilities the electrical demand is increasingly by 11-12 % annually. This is a challenge for every industry to ensure that energy growth in commercial building does not become unmanageable but also give and presents an opportunity to influence and identifies energy management issues in various commercial buildings and facilities. As the natural resources are limited and energy uses are increasingly very sharply so it is very necessary to save natural resources by reducing energy consumption which can be achieved by using energy efficient equipment's and also by awareness of peoples about energy conservation. Energy audit in industrial and commercial, is the process to identifying opportunities to reduce carbon footprints and energy conservation.

3.1.1 General

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur **Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon** entrusted the work of conducting a Detailed Energy Audit of campus at Tasgaon with the main objectives as below:

- To study the present pattern of energy consumption
- To identify potential areas for energy optimization
- To recommend energy conservation proposals with cost benefit analysis.

3.1.2 Case Study in Campus:

We are taking this opportunity to express our heartily gratitude to **Shri Swami Vivekanand Shikshan Sanstha, Kolhapur** **Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon,** on for giving opportunity for carrying Energy Audit in campus. We once again put up our appreciation for full cooperation & valuable guidance for perfect auditing of the Campus to technical as well as commercial persons for providing all the required information & data as well as for providing cooperation with all the departments & extend his best help in our work. We have tried our level best for the work of Energy Audit up to their satisfaction.

The major activities carried out during the audit are as follow:

- Collection of College's records regarding Electricity Power Bills, Power Distribution Diagram, Specifications of major power handling equipment – such as Fans, lighting and pumps.
- Analysis of above calculations, isolating the areas vulnerable to energy consumption not related to production.
- Recommendation of various methods of rectification.
- Making case study of projected saving by following our recommendations; and estimating potential investment &payback period.

3.1.4 Steps in Energy Auditing

The energy audit may range from a simple walk - through survey at one extreme to one that may span several phases.

- The first step is to identify the areas where energy is wasted and reduced energy without affecting the outputs of various functions.
- The second step is to implement energy efficient appliances in place of normal appliances which reduce energy use by proper operations and maintenance. For this reason, it is necessary to reduce the number of operating machines and operating hours according to the demands of the load, and fully optimize equipment operations.

  Energy audit depends on following factors: -
  Building equipment operation
  Lighting systems.
  Power systems.
  Building envelope
  Air-conditioning and ventilation equipment systems.
  Miscellaneous services
- The first two steps can be can be implemented without changing buildings and existing appliances.
- The third step would require investment for remodeling, rebuilding, or introducing further control upgrades to the building.
- The fourth step is to carry out large-scale energy reducing measures when existing facilities have past their useful life, or require extensive repairs or replacement because of obsolescence. In this case higher energy savings may be achieved. For these last two stages, the audit may be more extensive in order to identify more ECOs for evaluation, but at an increased need for heavier capital expenditure to realize these opportunities.

3.2 Introduction to Green Audit

Environmental Audit or green Audit is a systematic, documented, periodic and objective review by regulated entities of facility operations and practices related to meeting environmental requirements (EPA, 2003). In other words, it is a management tool comprising systematic, documented. Periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of helping to safeguard the environment by facilitating management control of practices and assessing compliance with company policies which would include regulatory requirements and standards applicable. (International Chamber of Commerce, 1989)

Environmental auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. Depending on the types of standards and the focus of the audit, there are different types of environmental audit. Organizations of all kinds now recognize the importance of environmental matters and accept that their environmental performance will be scrutinized by a wide range of interested parties.

Environmental auditing is used to investigate, understand and identify opportunities for better green campus.

3.2.1 Utility of Green Auditing

These are used to help improve existing human activities, with the aim of reducing the adverse effects of these activities on the environment. An environmental auditor will study an organization's environmental effects in a systematic and documented manner and will produce an environmental audit report.

4. Statement of Assurance

The energy and green audit is being conducted in 2022-23 for the first time in college. The audit is mainly conducted to check the implementation of energy conservation techniques. The audit procedure tried to meet the terms of international standard of internal auditing.

In our decision, sufficient and appropriate audit procedures were completed and evidence gathered to support the precision of the conclusion reached and contained in this report.

5. Objectives and Scope

5.1 Energy Audit:

The objective of the audit was to study the energy consumption pattern of the facility, identify the areas where potential for energy/cost saving exists and prepare proposals for energy/cost saving along with investment and payback period.

Scope of work and methodology were as per the proposal. While undertaking data collection, field trials and their analysis, due care was always taken to avoid abnormal situations so as to generate normal/representative pattern of energy consumption at the facility.

5.1.1 Approach to Energy Audit:

We focused our attention on energy management and optimization of energy efficiency of the systems, sub systems and equipment. The key to such performance evaluation lies in the sound knowledge of performance of equipment and system as a whole. The objective of Energy Audit is to balance the total energy inputs with its use and to identify the energy conservation opportunities in the stream.

Energy Audit also gives focused attention to energy cost and cost involved in achieving higher performance with technical and financial analysis. The best alternative is selected on financial analysis basis.

5.2 Green Audit

The objectives of the green audit are to promote the environment management and conservation in the college campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of environment sustainability in compliance with the applicable regulations, policies and standards.

The main objectives of carrying out green audit are

- To introduce and make aware students to real concerns of environment and its Sustainability
- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requires high cost.
- To bring out present status report on environmental compliance.

5.2.1 Audit goals of the college

The college, with the advice of the Internal Quality Assessment Cell (IQAC) has set up an environmental quality assessment body (GREEN CAMPUS) that aimed at performing the green audit of the institution. The main objectives of the audit are:

- More efficient resource management
- To provide basis for improved sustainability
- To create a green campus
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- Recognize the cost saving methods through waste minimizing and managing
- Point out the prevailing and forthcoming complications
- Impart environmental education through systematic environmental management approach and Benchmarking for environmental protection
- Financial savings through a reduction in resource use
- Enhancement of college profile

6. Energy Audit

6.1 Methodology

Energy Audit Study is divided into following five steps.

i. Preliminary Survey

In this Preliminary survey, the auditor may need to know the building envelope and its energy consumption. The data of a building can be obtained from: -

- Building Architectural blueprints.
- Building Air-conditioning blueprints.
- Building Electrical lighting and power drawings.
- Electrical bills and operation logs for the year preceding the audit.
- Air-conditioning manuals and system data.
- ECOs for evaluation, but at an increased need for heavier capital expenditure to realize these opportunities.

ii. Historical Data Analysis

The historical data analysis involves establishment of energy consumption pattern to establish base line data on energy consumption and its variation with change in production volumes.

iii. Actual measurement and data analysis

This step involves actual site measurement and field trials using various portable measurement instruments. It also involves input to output analysis to establish actual operating equipment efficiency and finding out losses in the system.

iv. Identification and evaluation of Energy Conservation Opportunities

This step involves evaluation of energy conservation opportunities identified during the energy audit. It gives potential of energy saving and investment required to implement the proposed modifications with payback period. All recommendations for reducing losses in the system are backed with its cost benefit analysis.

v. Walk though

The walk-through process can be start after familiarized with the building, if the building blueprints and other electrical appliance information available describes the building and its operation accurately. In the walk-through audit, the building envelope can be study by a walk around the building. In the model analysis, the building must be divided into zones for analysis. The building survey would include that the air-conditioning system is as indicated on plans. In the building envelope, the type and condition of the windows, effectiveness of window seals will be noted. In the building, typical lighting and power requirements, occupancy and space usage are also noted. This information regarding building could be compared against the recommendations in the relevant Codes of Practices. The survey of mechanical rooms and plant room can give system and plant data. Name plate information could be compared against those in the building's documents, and pumps and chillers room can be visit for estimating the load on the system.

Operator's Input The auditor may discuss with the building maintenance staff further on the operating schedules and seek clarification on any unusual pattern in the trend of the utility bills. Unusual patterns such as sudden increase or decrease in utility bills could be caused by changes in occupancy in the building, or change in use by existing tenants. It is not uncommon for tenants to expand their computing operations that may increase the energy use significantly

6.2 Historical Data Analysis

6.2.1 Source of energy

Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon uses Energy in following forms:

i) Electricity from MSEDCL

Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon receives Electricity from MSEBE

The following are the major consumers of electricity in the facility

- Computers
- Lighting
- Air-Conditioning
- Fans
- Other Lab Equipment

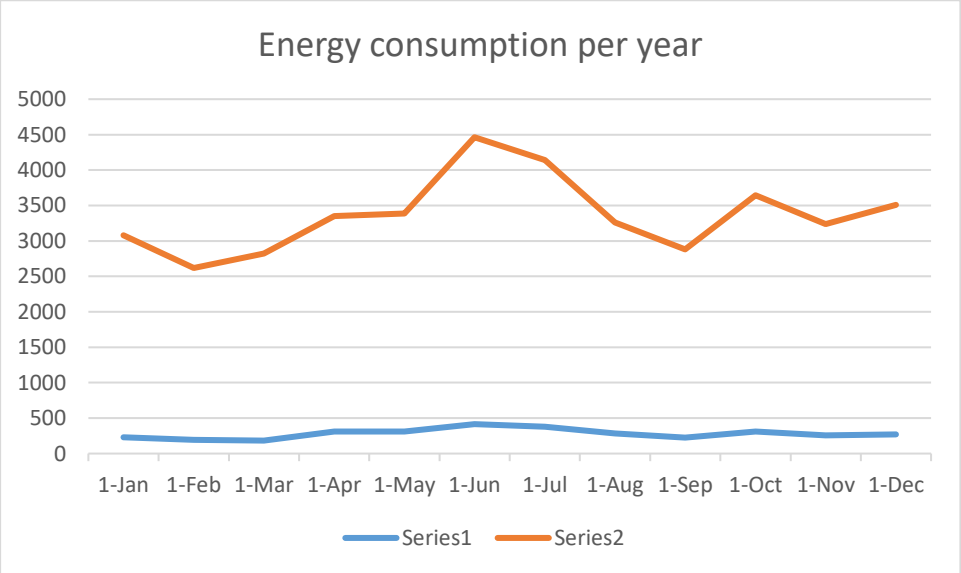
Record of monthly energy consumption of individual meter in Kwh (units) and respective Energy bill in Rupees is given below.

Sr.no	Month	Consumer no: 281510056786		Consumer no: 281510392077	
		Energy consumption (in units)	Electricity bill (in rupees)	Energy consumption (in units)	Electricity bill (in rupees)
1	March 23	147	1870	36	770
2	Feb 23	146	1800	46	1626
3	Jan 23	203	2274	27	577
4	Dec 22	234	2491	35	749
5	Nov 22	281	2470	24	513
6	Oct 22	293	2905	20	428
7	Sept 22	206	2295	17	364
8	Aug 22	273	2765	10	214
9	July 22	358	3360	19	406
10	June 22	395	3620	20	428
11	May 22	301	2800	12	257
12	April 22	304	2850	09	192

Month	Consumer no: 281510056786	Consumer no: 281510392077	Total energy Consumption (in units)
March 21	147	36	183
Feb 21	146	46	192
Jan 21	203	27	230
Dec 20	234	35	269
Nov 20	281	24	255
Oct 20	293	20	313
Sept 20	206	17	223
Aug 20	273	10	283
July 20	358	19	377
June 20	395	20	415
May 20	301	12	313
April 20	304	09	310

Month	Consumer no: 281510056786	Consumer no: 281510392077	Total energy bill (in rupees)
March 21	1870	770	2640
Feb 21	1800	1626	2426
Jan 21	2274	577	2851
Dec 20	2491	749	3240
Nov 20	2470	513	2983
Oct 20	2905	428	3333
Sept 20	2295	364	2659
Aug 20	2765	214	2976
July 20	3360	406	3766
June 20	3620	428	4048
May 20	2800	257	3075
April 20	2850	192	3042

	Month	Total Energy consumption and Electricity bill	
		Energy consumption (in units)	Electricity bill (in rupees)
1	March 21	183	2640
2	Feb 21	192	2426
3	Jan 21	230	2851
4	Dec 20	269	3240
5	Nov 20	255	2983
6	Oct 20	313	3333
7	Sept 20	223	2659
8	Aug 20	283	2976
9	July 20	377	3766
10	June 20	415	4048
11	May 20	313	3075
12	April 20	310	3042
	Average	**280**	**3085**

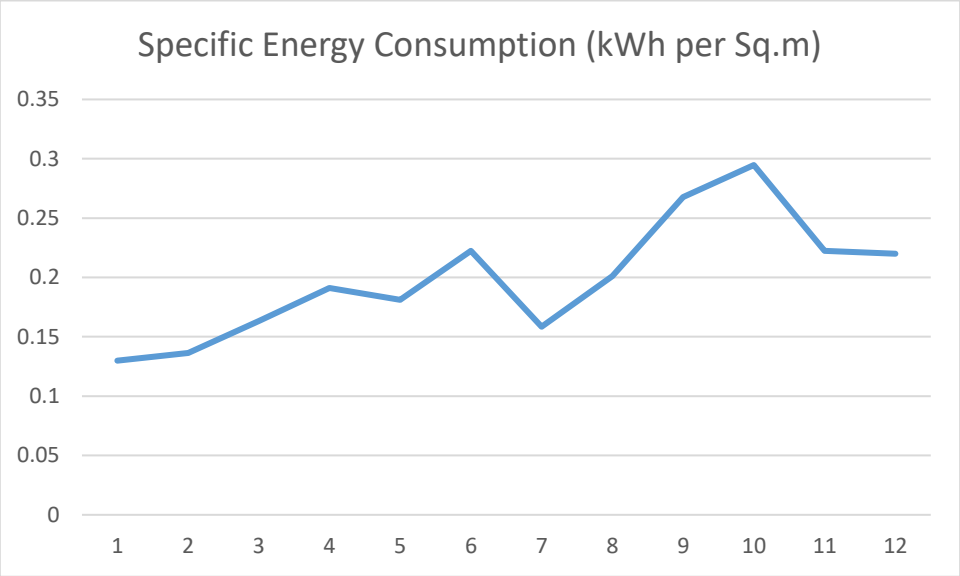


6.2.2 Specific Energy Consumption (SEC)

Specific Energy Consumption (SEC) is defined as energy usage per Square meter of area. it is calculated total electrical kWh/total area of the campus. By calculating SEC, we can crudely target the factors of energy efficiency or inefficiency. SEC for last twelve months was calculated and is as shown in the chart below.

Buildup Area : 1408.82 sq.m

Sr.no	Month	Energy consumption (in units)	Specific Energy Consumption (kWh per Sq.m)
1	March 22	183	0.1299
2	Feb 22	192	0.1363
3	Jan 22	230	0.1633
4	Dec 21	269	0.1910
5	Nov 21	255	0.1811
6	Oct 21	313	0.2223
7	Sept 21	223	0.1584
8	Aug 21	283	0.2010
9	July 21	377	0.2677
10	June 21	415	0.2947
11	May 21	313	0.2223
12	April 21	310	0.2201
	Average	**280**	0.199008



6.3 Study of Actual Measurement and analysis

6.3.1 Actual measurement of existing equipments

All required data is collected by Energy Audit Team. In this data, different classifications are done and made survey of the college. In this survey, in every room, how much fans, tubes, fans, computer, instrument AC, etc. will these is measured. According to survey following data is collected.

i) All Electricity consuming equipment and respective energy consumption in W

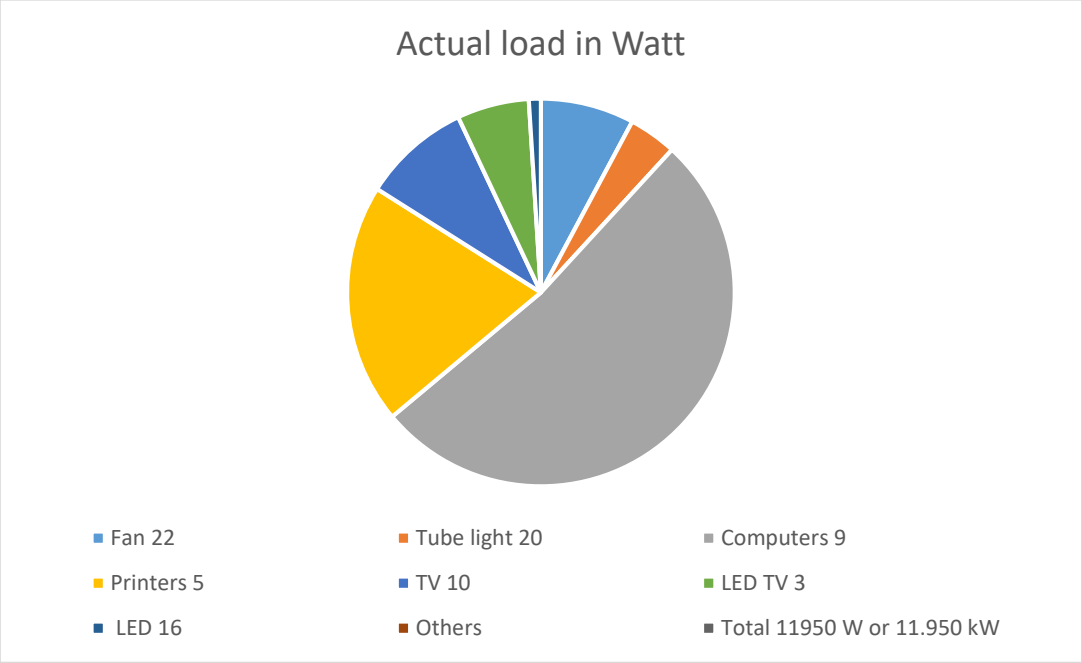
Department	**Electricity Consuming Equipment**	**Quantity**	**Energy consumption per equipment**	**Total energy consumption**
Lecture Hall I	Fan	3	78	234
	Tube light	7	40	280
	TV	1	100	100
	Computer	1	520	520
	LCD	1	50	50
	Sound system	1	40	40
Lecture Hall II	Fan	2	78	156
	Tube Light	2	40	80
	Projector	1	300	300
	LED	2	10	20
Computer Lab	Fan	2	78	156
	Tube light	2	40	80
	Old TV	7	90	630
	New TV	3	60	180
	Printer	1	200	200
	OHP	1	300	300
	UPS	3	150	450
Strong room	Fan	2	78	156
	Ups	1	150	150
	Computer	1	520	520
	Printer	1	200	200
	LED	1	10	10
Method Room Marathi, English, History	Fans	3	78	234
	Tube light	3	40	120
Science Lab	Fan	1	78	78
	Tube light	2	40	80

Library	Fan	4	60	240
	LED	5	10	50
	Computer	2	520	1040
Staff room	Fan	1	78	78
	Tube light	2	40	80
	Computer	1	520	520
Principle Office	Fan	1	78	78
	Refrigerator	1	200	200
	Computer	1	520	520
	Printer	1	200	200
	LED	2	10	20
Office	Fan	3	78	234
	Tube Light	1	40	40
	Computer	3	520	1560
	Printer	2	200	400
	Inverter	1	50	50
	Scanner	1	90	90
Passage	Tube light	4	40	160
	LED	1	10	10
Washroom	Tube Light	2	40	80
	Inverter	1	50	50
others	Water pump	1	150	150
	Cooler	1	750	750

Total Energy Consumption: **11950 W or 11.95 kW**

ii) Major electricity consuming equipment and respective total load

Equipment	Quantity	Actual load in Watt	Total Load in Watt
Fan	22	78	1716
Tube light	20	40	800
Computers	9	520	4680
Printers	5	200	1000
TV	10	90	630
LED TV	3	60	180
LED	16	10	160
Others			2734
Total	11950 W or 11.950 kW		



6.3.3 Requirement of NAAC

i) Alternative Energy Initiative

No alternative source of energy is available is campus.

ii) Percentage of lighting power requirement met through LED bulbs

Percentage of lighting power requirement met through LED bulbs

= (Lighting power requirement met through LED bulbs / Total lighting power requirement) X 100

a) Tube light : 800 Watt

c) LED : 160 Watt

Total lighting power required : 960 watt

Percentage of lighting power requirement met through LED bulbs

= (160/960) X 100

= 16.6%

6.4 Identification and evaluation of data

The electrical devices which are connected in college campus are not energy saving devices. These devices can be changed by electrical efficient appliances. The appliances are of high watt equipment so the electrical consumption is high in Tasgaon college campus. Now a day's low wattage appliances are used in building. They are helpful in saving electricity.

Table Energy Efficient Electrical Equipment

Power Consumption Comparison Between LED, LCD, CRT & Plasma:

Screen Size	LED	LCD	CRT	Plasma
15 inches	15	18	65	---
17 inches	18	20	75	---
19 inches	20	22	80	---
20 inches	24	26	90	---
21 inches	26	30	100	---
22 inches	30	40	110	---
24 inches	40	50	120	---
30 inches	50	60	---	150
32 inches	55	70	---	160
37 inches	60	80	---	180
42 inches	80	120	---	220
50 inches	100	150	---	300

Sr.No	Equipment	Make	Rating	Specification	Cost INR
1	20 W LED Tube light	Wipro	18 W	LED	300*
2	Fan (1200 mm)	Usha	50 W	BEE 4 star	1255*
3	Fan (700mm)	Usha	43 W	BEE 4 star	1135*
4	Exhaust fan	Usha	50 W	BEE 4 star 486 m3/min	1650*
5	Tube light	Philips	36 W	Lumen	250*

*Price is based on market rates

1) Tubes and CFL are replaced by LEDs.
2) Replacing the CRT Monitors with LCD Monitors:
3) Replacing regular fans by BEE 4 star fans

i)Energy Saving Calculations

Energy saving measurements of replacement of old Tube lights to LED lights

Particular	Unit	Values
Total no of tube lights	No.	20
Average running hours per day	No.	6
Average working days per year	No.	300
Average power consumption of tube lights	Watt	40
Total electricity consumed by tube lights per year	kWh	1440
Average power consumption of LED lights	Watt	10
Total electricity consumed by LED lights per year	kWh	360
Total electricity saving per year	kWh	1080
Rate of electricity	INR	12
Total monetary saving per year	INR	12960
Investment	INR	6000
Simple payback period	Months	5

Hence the payback time for replacing all conventional tube lights with LED is around 5 months.

Replacing regular fans by BEE 4 star fans

Particular	Unit	Values
Total no. of fans	no.	22
Average running hours per day	hours.	8
Average working days per year	no.	300
Average power consumption of Traditional fans	Watt	78
Total electricity consumed by Traditional fans	kWh	4118
Average power consumption by BEE 4 star fans	Watt	30
Total power consumption of BEE 4 star fans per year	kWh	1584
Total electricity saving per year	kWh	2534
Rate of electricity	INR	12
Total monetary saving per year	INR	30408
Investment	INR	30000
Simple payback period	months	12

.

Hence, the payback time for replacing all conventional fans of the campus with BEE 4 star rated fan is around 3 years.

*Payback period is more than average life of equipment so not recommended

Providing Solar PV system for part load operations during day time

A 3kW solar PV is proposed for lighting and other consumption devices. This solar system come with highly efficient solar panel that will generate 12units per day.

3kW quick overview

power generation – 12 units /per day

average cost – 2,30,000 – 3,50,000 INR

annual saving – 36000 INR

Area required - 18 sq.m

6.5 Recommendations

6.5.1 General Energy Audit Observations & Recommendations

Fans

➢ Use aero foil shaped fan blades.

➢ Use energy efficient motor for continuous or near continuous operations.

➢ Turn fans off when not needed.

Lighting

➢ Reduce excessive illumination levels to standard levels using switching, decamping etc.

(Know the electrical effects before doing decamping.)

➢ Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.

➢ Install efficient alternatives to incandescent lightings, etc. Efficient (lumens/watt) of

various technologies range from best to worst approximately as follows: - low pressure sodium, high pressure sodium, metal halide, fluorescent, mercury vapour, incandescent.

➢ Consider lowering the fixtures to enable using less of them.

➢ Consider day lighting, sky lightings etc.

➢ Use task lighting and reduce background illumination.

➢ Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.

Buildings

➢ Seal exterior cracks/openings/gaps with caulk, casketing, weather stripping, etc.

➢ Consider new thermal doors, thermal windows, roofing insulation etc.

➢ Install windbreaks near exterior doors.

➢ Consider covering some window and skylight areas with insulated wall panels inside the building.

➢ If visibility is not required but light is required, consider replacing exterior windows with insulated glass block.

➢ Consider tinted glass, reflective glass, coatings, awnings, overheads, draperies, blinds and shades for sunlit exterior windows.

Note: Remote control operated appliance use about 5% of the normal use electricity on Standby mode, therefore switching off the appliances from the mains can save avoidable waste of energy. While buying new appliances attention should be paid to standby energy usage and equipment with lower energy consumption and BEE star labelled product must be procured.

Man-made energy wastage

Ways energy is wasted in the College- Please control.

➢ Computer wastage: Computer should be switched off when it is not being used it should be in Standby mode to save energy.

Off the lights: Switching off bathroom or Labs lights when they are not in use is an easy option to save energy and costs. Using automatic switches that turn on and off depending on movement is an efficient way to ensure that the costs are kept to a minimum.

➢ Utilize your free resources: The biggest and brightest energy resource is outside and is free to use all year round, the sunshine. Instead of turning on all the lights in the office, if there is enough window space, open the curtain and let the sunshine to come in. This will reduce the use of heating and lighting need and hence energy cost.

Climate Control: Using programmable thermostats, office managers can automatically dial down the climate control at night and at other times when the office is unoccupied. Thermostats with zone control can adjust settings room-by-room, turning off, for example, air-conditioning to an unused conference room.The man-made energy wastages pointed in the report are not indented to blame anyone rather to encourage people to save energy and make contribution towards the prosperity of our nation..

7. Green Audit

7.1 Methodology

The Green Audit taken up by the **Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon** had been divided into three stages:

The Pre Audit Stage:

In the pre-audit stage, meetings provide an opportunity to support the capacity and objectives of the audit and enable discussions on the feasibility associated with the audit. The meeting provides the first opportunity to meet the audit and deal with several practical knowledge and concerns. The meeting provided the chance to gather information that the audit team can study before arriving on the site. The audit procedure and audit plan was handed over at this meeting and discussed in advance of the audit itself. In **Sansthamata Sushiladevi Salunkhe Mahila Shikshanshastra Mahavidyalaya, Tasgaon**, the planning of audit processes was discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the college management. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself.

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

The Audit Stage:

The Audit Stage encompasses of the team selection and the field works performed. Looking after the unique structure, location and ambiance of the college, the Green Audit Team focused on Material Issues pertaining to college which have the highest influence on the Green Attributes of the College. The Audit stage also focused on the Methodology adopted. Checklist approach is adopted for transparent evaluation of the topics and increase readability for independent reader.

The Post Audit Stage:

The post-audit stage ensures formulation of Draft findings and sent to management response. Since the audit is done internally, it was important to ensure management approval for the draft. After getting draft approval, the audit team went for final report formulation.

The methodology adopted to conduct the Green Audit of the Institution had the following components.

Onsite Visit :

The Green Audit Assessment Team started the audit at the Institution on (write date) which extended for about 3 days. Greenhouse gas emissions and carbon footprint reduction through adoption of green energy and energy-efficient measures were assessed. The key focus was on assessing the status of the green cover of the Institution.

Focus Group Discussion :

The Focus Group included staff members and management people. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional, district, national and global level. The discussion revolved around three key questions

Do the members of the group consider themselves eco-conscious? Do they consider the Institution to be eco-friendly? What do they think are the issues that need to be given top priority?

Office/Building Survey :

Information on office-based environmental impacts like built-up area, utility bills, energy-saving devices and IT equipment was collected. This information was added to the carbon footprint data, generating a fairly clearer picture of the Institution's annual greenhouse gas emissions and impact of the reduction measures undertaken.

Carbon Footprint :

Data collected from the following sources were taken into consideration to calculate carbon footprint emission and reduction. The floristic richness of the campus – total number of plants, trees, shrubs – was estimated. The impact of alternate green energy production and consumption to reduce fossil fuel-based energy was assessed, e.g. the number of CFL, LED, tube lights and electronic chokes was counted. The Carbon Footprint Calculator was used to arrive at conclusions.

Carbon Footprint Calculator enables the measurement of carbon emission by the Institution. Besides, by breaking down the value to key 'carbon drivers', the institution can know how much of carbon footprint comes from which type of behaviour (high power-consuming incandescent bulbs vs. LED lights, solid waste management, etc.).

7.2 Audit Framework and detailed findings

7.2.1 Water management

The following audit framework is used for conducting Green Audit in 2020-21. The framework also lists the findings and observations for every criterion

i) Water distribution system: Borewell

Underground water is one of the important sources of water in urban areas. With increasing urbanization, underground water has indiscriminately exploited causing depletion in water table and water availability. To reduce the effect of over exploitation, ground water discharge need to be taken up in large scale at residential and institutional buildings.

ii) Audit Observations:

- The college has 2 aqua guard filters installed in all departments.
- Campus has efficient plumbing system from maintenance and operation point

iii) Recommendations:

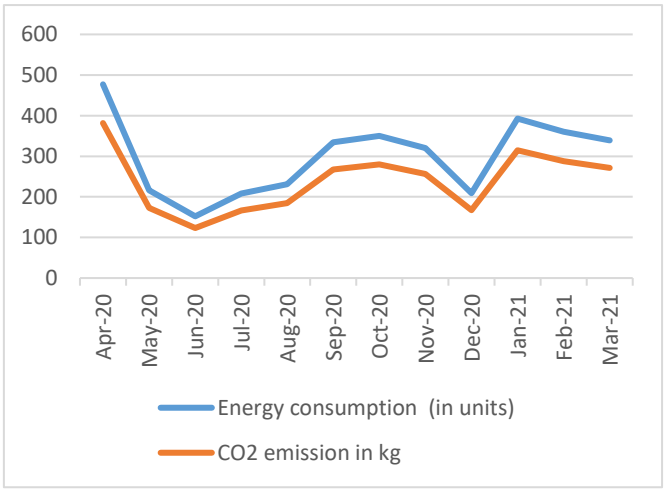
- Use Rain Water Harvesting System : It is simple collection or storing of water through scientific techniques from the areas where the rain falls. This practice solves the problem of deficiency of water and ground level of water increases.
- It is recommenced to use Drip irrigation for plant watering system to maintain wastage of water.
- It is recommended to use aerators to water taps, automatic toilet faucets and dual flush toilet with cistern.
- Use of low flow/ flow control water equipment or gadget.
- Water distribution diagram/ water network/ water balance diagram would be useful for monitoring and reducing water consumption.
- Sewage treatment plant for treated sewage recycle would be useful for recycling water after treatment.
- Though water is used nominal in the college, but to ensure a further minimal rate, placards and warnings should be set up in the college premise.

7.2.2 Energy management

i) Carbon Dioxide Emission

For consumption of 1 Unit (1 kWh) of Electricity, the CO2 emitted is 0.8 Kg. OR the Emission is 0.8 Kg/kWh. In the following Table we present the total units consumed and CO2 emitted as under

Sr.no	Month	Energy consumption (in units)	CO_2 emission in kg
1	March 21	339	271.2
2	Feb 21	360	288
3	Jan 21	393	314.4
4	Dec 20	209	167.2
5	Nov 20	320	256
6	Oct 20	350	280
7	Sept 20	334	267.2
8	Aug 20	231	184.8
9	July 20	208	166.4
10	June 20	152	123.2
11	May 20	216	172.8
12	April 20	477	381.6
	Average	**299.08**	**239.4**



ii) Recommendations:

- Appreciate that it is preferable to purchase electricity from a company that invests in new sources of renewable and carbon-neutral electricity.
- Look in to the possibility of on-site micro-generation of renewable electricity.
- Give preference to the most energy efficient and environmentally sound appliances available, this includes only using energy-saving light bulbs.
- Encourage staff, students and conference guests to save energy through visible reminders, incentives and information to increase awareness. This particularly concerns turning off electrical appliances when not in use.

7.2.3 Green Campus

The Carbon Audit tools and analysis methodology were developed collectively by the Green Audit Team and based on that the audit was conducted in three major thematic areas. Carbon footprint is historically defined as the total set of greenhouse gas emissions caused by an individual, event, organization or product, expressed as carbon dioxide equivalent. Collected data at college campus is given below.

Sr.No.	Type of trees	No. of trees/ area
1	Full grown trees	4
2	Semi grown trees	5
3	Bushes	65
4	lawn	nil

Environmental Awareness

Green Campus

i) Tools to measure Carbon Absorption:

Assumptions Number of mature trees in 1 acre = 700

Carbon absorption capacity of 700 trees is equivalent to carbon emitted by a speeding car for 26,000 miles. 3. 26,000 miles = 41,843 km

Average kilometers covered by a car per litre of petrol is 20 km

Total quantity of petrol consumed by the car (41,843/20) = 2092 litres

The carbon emitted by a car due to consumption of 1 litre of petrol is 2.3 kg CO_2.

At this rate the total quantity of carbon emitted by 2092 litres of petrol (2092×2.3 kg)=4812 kg CO_2 or 4.8 tonnes of CO_2.

Therefore, the carbon absorption of one full-grown tree is 4812/700 = 6.8 kg CO_2.

The footprint calculation is based on the standard unit of 1 litre petrol = 2.3 kg CO_2.

Carbon absorption capacity of one full-grown tree = 6.8 kg CO_2.

Therefore the carbon absorption capacity of 4 full-grown trees in the campus of the Institution (4×6.8 kg CO_2) = 27.2 kg of CO_2.

The carbon absorption capacity of 5 semi-grown trees is 50% of that of full grown trees. Hence, the carbon absorption is (5× 3.4 kg CO_2) = 17 Kg of CO_2 .

There are 65 bushes of various species being raised in the gardens of the Institution.

Carbon absorption of bush plants varies widely according to the species. Certain bushes absorb as high as 49,000 g CO_2 per plant, whereas some others absorb as low as 150 g CO_2 per plant. In the absence of a detailed scientific study and botanical survey, the per-plant carbon absorption was assumed to be 200 g (in consultation with environment scientists).

Based on this, the total carbon absorption of 500 plants was calculated to be

(65× 200gm CO_2) = 13Kg of CO_2 .

Sr No.	Type of trees	No. of trees/ area	Quantity of CO2 absorption per tree	Total quantity of CO2 absorbed (Kg)
1	Full grown trees	4	6.8 kg	27.2 kg
2	Semi grown trees	5	3.4 kg	17kg
3	Bushes	65	200 gram	13 Kg
4	lawn	---	---	---

ii) Tools to measure oxygen emission:

According to the Arbor Day Foundation, 'a mature leafy tree produces as much oxygen in a season as 10 people inhale in a year' A person breathes 7 or 8 litres of air per minute. Air is about 20% oxygen. But the exhaled air has about 15% oxygen, and hence the net consumption is about 5%. Therefore, a person uses about 550 litres of pure oxygen each day.

Calculation of oxygen emission by flora:

The number of litres in 1 kilogram depends on the density of the substance being measured. Litre is a unit of volume, and kilogram a unit of mass. Litres and kilograms are approximately equivalent when the substance measured has a density of close to 1 kilogram per litre.

On average, one full-grown tree produces nearly 117.6 kg of oxygen each year.

Two mature trees can provide enough oxygen for a family of four.

Total oxygen emitted by 353 full-grown trees per year

(117.6 kg × 4) = 470.4 Kg of O_2

One semi-grown tree produces 58.8 kg of oxygen per year.

Total oxygen emitted by semi-grown trees (oxygen emission is 50% of that of the full-grown tree).

(58.8 kg × 5) = 294 kg

Total oxygen emitted by 65 bushes is calculated based on the following oxygen-inhaling requirement per person per day. A normal human being requires 550 litres of oxygen per day. 400 bushes produce enough oxygen per day to enable a person to breathe adequate quantity of oxygen of 550 litres.

Total quantum of oxygen produced by 400 plants per day is 550 litres of oxygen.

Taking 400 plants as one unit, the number of units of bushes in the campus

(65/400) =0.1625 units.

Total quantity of oxygen produced by 0.1625 units is (0.1625 × 550 litres) = 89.375 litres of oxygen per day.

The annual production of oxygen at this rate

(89.375 × 365) = 32.621.875 litres or kg of oxygen per year

iii) Summary:

Sr. No.	Type of trees	No. of trees / area	Quantity of CO2 absorbtion per tree	Total quantity of CO2 absorbed (tonnes)	Quantity of oxygen emmision per tree	Total Quantity of oxygen emmision
1	Full grown trees	4	6.8 kg	27.2 kg	117.6 kg	470 kg
2	Semi grown trees	5	3.4 kg	17 kg	58.8 kg	294 kg
3	Bushes	65	200 gram	13 kg	1177.5kgper day	32621.875 Kg
4	lawn	--	---	---	---	---
Total				**75.2 kg or Approx. 4 Tonne per year**		**33385.875kg or 33.385 tonnes per year**

iv) Audit Observations :

- College already has a well maintained garden.
- The college celebrates an annual tree plantation program in the campus where students and teachers plant trees in the campus.
- Negligible amounts of washing liquids are used in the college and all the toilet cleaners are not eco-friendly.
- Green education has been given to improve environmental awareness
- College has been providing E- Resources: E books, Online Journals to save papers

7.2.4 Waste Management

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone.

The present Prime Minister of India Sri Narendra Modi launched 'Swachh Bharat Abhiyan' (Clean India Mission) on 2nd October, 2014. In this mission, the proper use of dust/waste bins is one of the major priorities. For the implementation of this mission, collective mass effort is necessary. For proper segregation and management, proper use of waste bins is the only solution for waste management purpose in the college campuses.

i) Recommendation:

- It is recommended to install vermicomposting setup. It is easiest way to recycle agricultural waste and to produce quality compost.
- Encourage the faculties and students to plant trees in the garden.
- Ensure that all cleaning products used by college staff have a minimal detrimental impact on the environment, i.e. are biodegradable and non-toxic
- Dispose the chemical waste generated from the laboratories in a scientific manner.
- Create “Green Team” in the institution to increase awareness among students.
- E Publishing reviews of new green resources in the newsletter or news.
- Recycling beyond paper i.e. plastic, e- waste.

7.3 Recommendations

- There exists vast scope to improve the green campus status of the College through biodiversity promotion and tapping green energy sources.
- 1000 sq. ft. area of lawn shall be raised through the involvement of students to enhance oxygen emission by another 10%.
- It is recommended to install vermicomposting setup. It is easiest way to recycle agricultural waste and to produce quality compost.
- Use Rain Water Harvesting : It is simple collection or storing of water through scientific techniques from the areas where the rain falls.
- It is recommenced to use Drip irrigation for plant watering system to maintain wastage of water.
- Energy-efficient measures such as replacement of all incandescent bulbs with LED lamps, old electrical regulators of fans with energy-efficient electronic regulators, air-conditioning units with all-star rated systems need to be undertaken.
- Biogas plants shall be installed in the campus using solid waste and night soil generated from the Girls Hostel in the campus. The biogas shall be used by the Hostel Kitchen and College canteen.
- Water quality testing will be installed in one part of the laboratory to test the the drinking water to ensure the students are free from water-borne diseases. All the water taps shall be fitted with high-efficiency aerator taps to reduce wastage of water. All toilets shall be fitted with dual flush water closets, which will reduce water consumption by 40%.
- Environment education shall be imparted to all college students through 1-hr life-skill classes once a week. This will create wide-level environment consciousness among the student community. They will be sensitized to encourage pillion riding with their peers or use public transport instead of two wheelers. Moreover, they will also motivate their parents to replace all the incandescent or fluorescent bulbs with energy-efficient LED bulbs.

Rain Water Harvesting and Ground Water Recharging

- Rain water harvesting is a technique of collection and storage of rainwater into natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers before it is lost as surface runoff.
- Rain water harvesting system should be incorporated in the architecture plan and install in the college building. The water from rooftops and floors is collected through down pipes and discharged in the ground as well as in recharge pits near borewell through pipe lines in the campus. The system ensures percolation of the rainwater into soil.

7.3.1 Recommendation for 3kW Solar PV:

Solar is an efficient way to generate free electricity for your home without putting a strain on your wallet. Both households and businesses are opting for home solar systems in large numbers. Solar is likely to replace conventional energy sources in the near future.

A 3kW solar panel system can generate enough power to meet the energy needs of a small house or business. Wonder how much electricity a 3kW solar system produces? On average, this system size has between 8 and 11 solar panels.

The power units generated by 3kW solar panels per day in sunny weather conditions is 12kWh. Therefore, you are likely to receive a monthly supply of 360 kWh of electricity on average.

The Working of 3kW Solar Panels

Solar photovoltaic technology is utilized in panels to generate electricity. Regardless of your 3kW solar panel size and type or the nature of your solar energy system, the power is generated through the same photovoltaic effect.

When the photons in the sunlight come in contact with a PV module, the solar cells strung together absorb these photons. This creates a flow of energy or direct current, and it requires a solar inverter to transform it into usable alternating current (AC) energy. This converted energy then powers your home or office.

3kW Solar System Price List & Specifications

The prices for a 3kW solar system for homes in India vary depending on the type of panels. Other factors include the quality of the solar components making up your 3kW solar system and the mounting structure used to set up your solar PV array. On average, your upfront solar investment can range between Rs. 1,60,000 to 3,00,000. Here is an estimate of what 3000-watt solar panel system prices in India may look like.

Model	3kW Solar Price
3kW On-grid solar system	Rs. 1,65,000
3kW Off-grid solar system	Rs. 2,40,000
3kW Hybrid solar system	Rs. 2,70,000

The key specifications associated with a 3kW rooftop solar system are outlined below:

Key components	Solar panels (at least 75% performance efficiency), solar mounting structure, solar inverter, solar batteries (optional), the balance of system

	(cables, fuses, MCBs, and Distribution boxes) **All components should be in compliance with MNRE guidelines and ALMM standards to be eligible under the subsidy scheme.*
Energy output	How many units of power is generated by a 3kW solar panel system? – 12 units of electricity/day – 360 units of electricity/month – 4,320 units of electricity/year
Appliances powered	All home appliances, such as a TV, washing machine, fan, fridge, and lighting system
Area required for 3kW solar panel system	A 300 sq ft open, shade-free space

By staying connected to the grid, you take advantage of the net metering mechanism and send and withdraw power as needed. Also, your solar batteries store surplus solar electricity generated by your solar panels. This unused electricity is supplied when the grid is down or during night hours.

If you are wondering about the price of a 3kW hybrid solar system in India, expect it to be somewhat around 2,70,000 including installation fees. The cost of this type of system exceeds the normal cost as it uses more components than others.

3kW Solar system Facts & Benefits

A 3kW solar system generates 12–15 units per day. You can save between Rs. 66 and Rs. 90 per day, and between Rs. 1,650 and Rs. 2,250 per year. Within three years, the collected savings can help pay for the entire installation.

You can become self-sufficient from the regional utility grid by using solar power.

Based on Indian weather conditions, solar panels are functional 300 days out of 365 days a year. A power outage won't ever be a concern if you choose to add solar batteries.

Solar energy is the most environmentally-friendly energy source available. The solar energy generation process doesn't emit any greenhouse gases.

Solar panels continue to generate electricity (at a reduced efficiency level of 70% or below) beyond the 25 years of warrantied lifespan.

The price of a 3kW solar system in India with subsidy is quite affordable if you consider the savings and financial gains of solar. Most households recover the upfront solar investment in 6-8 years through these savings.

Facts About a 3kW Solar System

Solar batteries and the inverter in a 3kW solar system come with a product warranty of 5-10 years. Solar panels have 25 years of performance warranty.

Only on-grid and hybrid solar systems for residential use qualify to benefit under the national rooftop subsidy scheme.

To subsidise your 3-kilowatt solar panel system price, make sure you use made-in-India solar components and have the system installed only by an empanelled vendor. Remember to check out all the important eligibility details on the National Portal for Rooftop Solar if you want to benefit under the subsidy scheme.

3kW Solar System Installation Cost in India

Having figured out your 3kW solar panel price in India, it's important to consider the cost of installation. Correct installation of your solar panels is the key to ensuring the efficient working of the panels and maximum energy output.

So the total 3kW solar plant price involves the cost of the module mounting structure. Also, professional expertise is required to determine the correct orientation, size, shading, and average sun hours for setting up the solar panel array.

3kW Solar Panel System Price in India with Subsidy

For rooftop solar plants installed for residential use all over India, the following Central Financial Assistance (CFA)/ Central Government Subsidy are available.

Rooftop Solar System Capacity	Applicable Subsidy (₹)
Up to 3 kW	14,588/kW
Above 3 kW and up to 10 kW	7,294/kW*
Above 10 kW	94,822**
Note: *₹14,588/kW for the first 3 kW and ₹7,294/kW for the rest of the capacity up to 10 kW. **The subsidy amount is fixed for rooftop solar systems above 10 kW capacity.	

The CFA calculations in the table below give an estimate of what to expect when it comes to 3kW solar panel price in India with subsidy.

Model	3kW Solar Plant Price	Subsidy Applicable	Prices After Subsidy
3kW On-grid solar system	Rs. 1,65,000	Rs. 14,588 X 3 = Rs. 43,764	Rs. 1,21,236
3kW Off-grid solar system	Rs. 2,40,000	Not applicable	No change
3kW Hybrid solar system	Rs. 2,70,000	Rs. 14,588 X 3 = Rs. 43,764	Rs. 2,26,236

8. Conclusion

Natural resources on earth are limited and consuming very sharply. It can be saved by employing energy efficiency and it is very necessary to prevent depletion of natural resources. The Electrical audit of college buildings shows that the load of electrical equipment's is significant and should be taken some necessary step for reducing energy conservation. Today energy conservation plays a very important role for energy conserving because energy consumption is increasing day by day but the natural resources are not increasing and also generation is not match with consumption People should aware about energy conservation and reduce energy consumption by adopting modern technologies.