



**MARATHA VIDYA PRASARAK SAMAJ'S  
G.M.D. ART'S, B.W. COMMERCE AND SCIENCE  
COLLEGE, SINNER, DIST. NASHIK**

# **ENERGY AUDIT REPORT**

## **2021-2022**

**PREPARED BY  
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## ENERGY AUDIT TEAM

### A) EXTERNAL AUDIT TEAM:

1. **Dr. Pravin M. Nalawade**  
Certification No.: IN/14019/144609  
Energy Audit



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2. **Dr. Sambhaji R. Pagar**  
Certification No.: IN/14019/144773  
Energy Audit



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### B) INTERNAL AUDIT TEAM:

Sr. No.	Name of Member	Designation	Title in Committee
1	Dr. C. E. Gurule	Assistant Professor	IQAC Coordinator
2	Mr. A. B. Chavan	Assistant Professor	Coordinator
3	Mr. M. D. Shinde	Assistant Professor	Member
4	Smt. V. B. Gunjal	Assistant Professor	Member
5	Mr. R. D. Khurche	Assistant Professor	Member



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# 1. INTRODUCTION OF THE ENERGY AUDIT

## 1.1 About Parent Institution:

The Maratha Vidya Prasarak Samaj is one of the most prestigious centers of learning in the State of Maharashtra. It has been over 108 years that it has stood the test of time to become legend of unparalleled stature. History says that the credit for the birth of M.V.P. Samaj goes to the young, enthusiastic and devoted team of social workers and educationists who were inspired by the lives of Mahatma Jyotiba Phule, Savitribai Phule and Rajashri Shahu Maharaj of Kolhapur. These young leading lights include Karmaveer Raosaheb Thorat, Bhausahab Hire, Kakasaheb Wagh, Annasaheb Murkute, Ganpat Dada More, D. R. Bhonsale, Kirtiwanrao Nimbalkar and Vithoba Patil Khandalaskar, who laid the foundation of the Samaj. They were the men who envisioned a culture and knowledge centric society. The motto of the Samaj reads for the *"Well being and Happiness of the masses to kindle the social cause."*

## 1.2 About College:

Maratha Vidya Prasarak Samaj's G.M.D. Arts, B.W. Commerce and Science College is one of the leading institutions of higher education imparting student-centric knowledge in Nashik district of Maharashtra state. The college recently celebrated its Golden Jubilee year in 2019-20 as it was established in the year 1969. It focusses on the growth and development of the students belonging to rural area in Sinnar Tehsil and around. It has been decorated with the best college award in rural area in 2011-12. The college is located on the Nashik-Pune highway not very far from the main city. The importance has always been given to green campus and eco-friendly academic ambience. For this, we tried our best to plant more trees in the campus and developed various gardens around the main building. 'Green College, Clean College' is our motto.

The college has been running near about 22 UG courses and more than 10 PG Courses. The NCC unit for both the boys and girls provides paramilitary training to the students. We have NSS Scheme which creates social and patriotic awareness among the students. Cultural Association, Extra-mural Studies, *Avishkar*, and many more extra-curricular activities are run in the college. The college has been preparing to make it able



to implement NEP (New Education Policy-2020). College have achieved 'A' grade in the third cycle of NAAC.

#### **1.2.1 Vision of College:**

- To impart quality and skill-oriented education based on Vedic Values and Modern science
- To create compassionate hearts and global minds
- To infuse social and environmental awareness
- To ignite latent talents

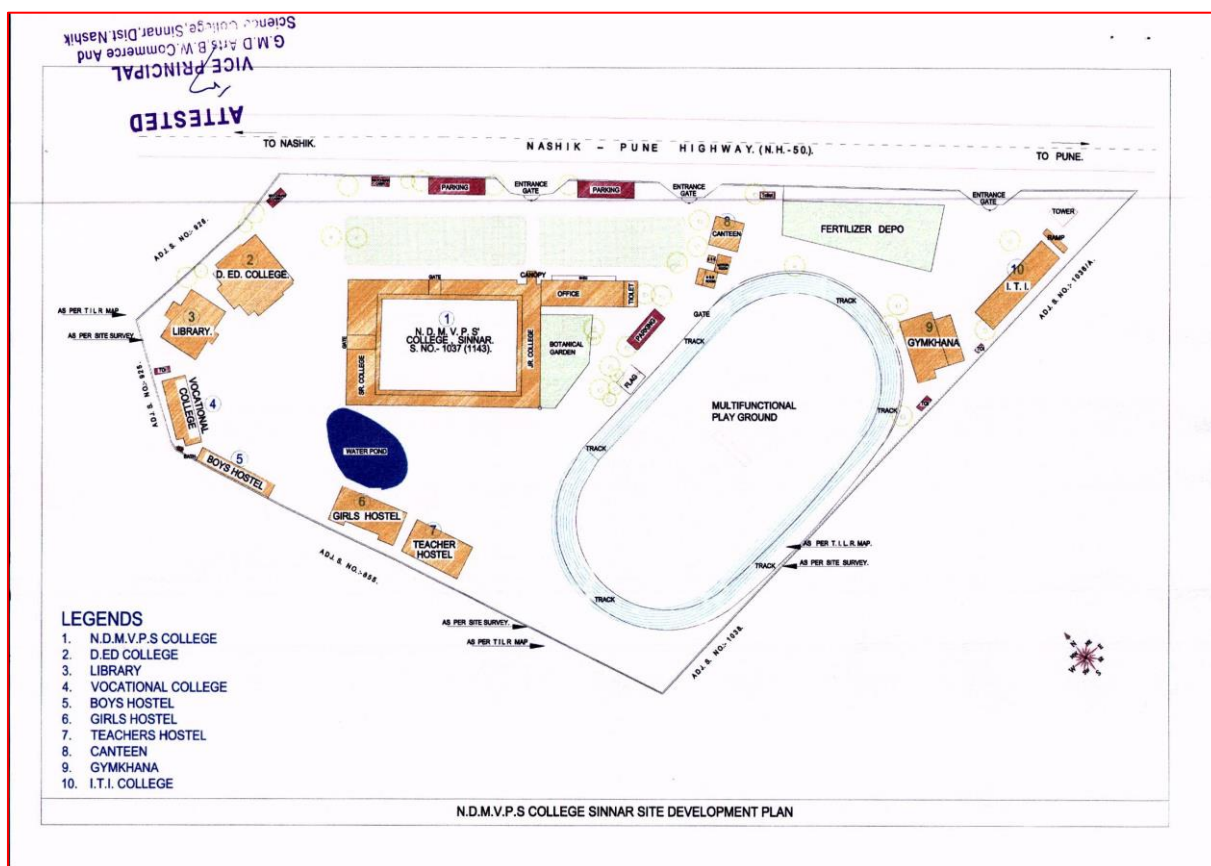
#### **1.2.2 Mission of The Institute:**

- To impart holistic education that blends Vedic values and scientific outlook to expand the frontiers of knowledge
- To empower the poor and down-trodden sections of society
- To acquaint the students with yoga and Vedic knowledge
- To imbibe the spirit of gender equality, importance of physical, moral, intellectual, social, emotional and cultural well beings
- To offer job-oriented, real-life and skill based education
- To create awareness about global challenges
- To inculcate self-discipline, self-reliance and self-respect
- To develop research culture
- To instill in young minds a sense of national pride and patriotism

#### **1.2.3 Objectives of the leadership:**

- To Create Ample Opportunities For The Poor And Down-trodden Sections Of Society Through Scholarship, Fees Concessions And Free Library Access
- To Arrange Carrier-oriented Short-term Courses, Competitive Exams, Campus Placements And MoUs With Various Institutions
- To Organize Lectures, Workshops And Seminars To Create Gender Equality Awareness Among Students
- To Conduct Dharmashiksha Pariksha, Yoga Programs And Vedic Exhibitions
- To Motivate The Teachers To Avail Research Grants And To Provide Seed-money To The Teachers For Research

- To Help Poor And Needy Students By Offering Non-government Scholarship And Through Dayanand Earn While Learn Scheme



#### 1.4 Energy Conservation Committee:

**Table 1 Energy Conservation Committee**

Sr. No.	Name of Member	Designation	Title in Committee
1	Prin. Dr. P. V. Rasal	Principal	Chairman
2	Dr. C. E. Gurule	Assistant Professor	IQAC Coordinator
3	Mr. A. B. Chavan	Assistant Professor	Coordinator
4	Mr. M. D. Shinde	Assistant Professor	Member
5	Smt. V. B. Gunjal	Assistant Professor	Member
6	Mr. R. D. Khurche	Assistant Professor	Member

#### 1.5 Function of Energy Conservation Committee:

The following are among the various functions assigned to Bureau of Energy Efficiency:

- ✚ Creating awareness and proper dissemination of information on energy efficiency and conservation;
- ✚ Organising the training for the efficient use of Energy and its conservation, to the personnel associated.
- ✚ Promotion of the use of energy efficient processes, equipment, devices and systems in general domain;

### 1.6 Courses Offered:

**Table 2 Courses offered by College**

Sr.No	Name of Faculty	Name of Program	Name of Subject
1.	Faculty of Arts	B.A.	Economics
2.			English
3.			History
4.			Defense & SS
5.			Political Science
6.			Psychology
7.			Marathi
8.			Geography
9.		M.A.	English
10.			Economics
11.			Geography
12.			Marathi
13.			Defense & SS
14.			Political Science
15.	Faculty of Commerce	B.Com	BCom
16.		M.Com.	MCom
17.	Faculty of Science	B.Sc.	Botany
18.			Zoology
19.			Chemistry
20.			Electronics
21.			Microbiology
22.			Physics
23.			Mathematics
24.		Computer Science	
25.		M.Sc.	Organic Chemistry
26.			Physics
27.	Zoology		
28.	Faculty of Vocational	B.Voc.	LPM
			FPP



## 1.7 Total Population of Campus:

TABLE 3 TOTAL POPULATION OF CAMPUS

Sr.No.	Particulars	Total number
1	College Staff (Teaching and Non-Teaching)	139
2	College Students (Girls and Boys)	3775
3	Floating Population (Visitors)	100 daily
	Total	4014

## 1.8 Introduction of Energy Audit:

The need for Energy has increased significantly as the economy has risen. Furthermore, the high energy intensity of several sectors is a source of worry. In such a setting, the efficient use of energy resources and their conservation become critical for reducing wasteful consumption and ensuring long-term development. Recognizing that efficient energy usage and conservation is the most cost-effective way to satisfy rising energy demand, the Indian government adopted the Energy Conservation Act, 2001 and formed the Bureau of Energy Efficiency in March 2002.


The Act establishes and strengthens the delivery system for energy efficiency services in the country and provides much-needed coordination among the various authorities. Energy conservation is a national cause. We must all join hands and make every effort to make India an Energy-efficient economy and society so that we can compete not only in our local market but also in the international market.

An energy audit is an inspection, survey, and analysis of energy flow for energy conservation in a building, process, or system to reduce the amount of energy input into the system without negatively affecting the output(s). An energy audit is the first step in identifying opportunities to reduce energy expenses and carbon footprints in commercial and industrial real estate.

As per The Energy Conservation Act, 2001, Act No. 52 of 2001, “*energy audit*” means the verification, monitoring and analysis of the use of energy, including submission of a technical report containing recommendations for improving energy efficiency with cost-benefit analysis and an action plan to reduce energy consumption;’

## 1.9 Objectives of Study :

The green audit's major goal is to encourage environmental management and conservation on the college campus. The audit's goal is to identify, measure, explain,



and prioritise a framework for environmental sustainability that adheres to all applicable legislation, policies, and standards. The following are the major goals of a Green Audit:

The primary objectives of Energy Audits are

- To study the present level of Energy Consumption
- To assess the various equipment/facilities from the Energy efficiency aspect
- To study Scope for the usage of Renewable Energy
- To study various measures to reduce the Energy Consumption

### 1.10 Methodology:


The methodology adopted for this audit is

- Formation of audit Team for specific areas and end-use.
- Visual inspection and data collection
- Observations on the general condition of the facility and equipment and quantification
- Identification/verification of energy consumption and other parameters by Measurements
- Detailed calculations, analyses, and assumptions Validation
- Potential energy-saving opportunities
- Suggestions for Implementation
- As the first step in this regard, one team of 2 Energy Auditor from the KTHM College, Nashik, were formed and assigned a particular area or application of Energy on the campus. The activity was organized as per the request received from G.M.D. Arts, B.W. Commerce and Sciece College, Sinnar. The approach for doing a Energy audit comprised several instruments such as questionnaire development, physical inspection of the campus, observation and study of paperwork, interviewing key people, data analysis, measurements, and suggestions.

### 1. 11 Steps in Energy Audit:

#### Pre-Audit

1. Make a plan for the audit.
2. Form an auditing team.

- 
3. Schedule for an audit.
  4. Gather the necessary background information regarding institute and Energy Audit.

 On Site

1. Understand the scope of audit
2. Analyse the strengths and weaknesses of the internal controls
3. Conduct the audit
4. Evaluate the observations of audit program
5. Prepare a report of the observations side by side

 Post-Audit

1. Produce a draft report of the data collected
2. Produce a final report of the observations and the inference with accuracy
3. Distribute the final report to the management
4. Prepare an action plan to overcome the flaws
5. Keep a watch on the action plan

### 1.12 Scope of Work:

The following Environmental Issues were studied for the above-mentioned campus area.

- Present level of Energy Consumption Energy Audit
- Assess the various equipment/facilities from the Energy efficiency aspect
- Scope for the usage of Renewable Energy
- Various measures to reduce the Energy Consumption

This study has been prepared based on the available data, samples, and information supplied by the MVP Samaj's, G.M.D. Arts, B.W. Commerce and Sciece College, Sinnar and recommendations for improving the efficiaent use of Energy have been made by college officials.

## 2. Energy Consumption Analysis

### 2.1 Introduction

The College using Electricity as a main Energy Source. Sectioned load for College is 30 KW (Meter No. 055-X1340449)

**TABLE 4 BASIC INFORMATION OF THE COLLEGE REGARDING ENERGY**

Sr.No.	Perticulars	Inputs
1	Built up-Area (sq.ft):	14896 Squar meter
2	Sanctioned Load (KVA):	30 KVA
3	Type of Supply : (1/3 phase)	both
4	Tariff Cat : (Commercial/Domestic)	88 LT- VII B I
5	Transformer Distance (in Mtr):	200 METER
6	List ways that use energy in your College (Electricity, Disel, Firewood, etc)	ELECTRICITY, DIESEL, LPG GAS, SOLAR PANNEL
7	Alternative energy Sources:	Solar Pannels
8	Energy Conservation and Efficiency Implementation Measures :	Use of LED Lights
9	Year of Implementation:	
10	Date of previous Energy Audit : (If any)	

College is using Electricity, Diesel, LPG Gas and Solar Pannel as a energy source. College using LED Lights as a Energy Conservation and Efficiency Measures to reduce energy.

### 2.2 Electricity Bill Analysis of the College:

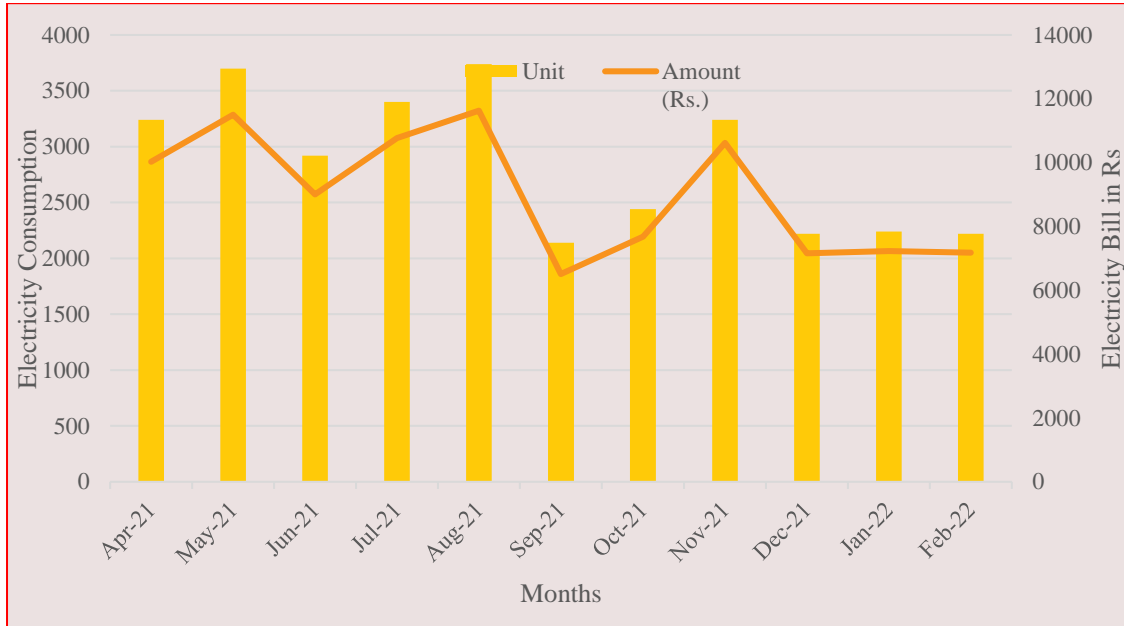
**Table 5 Electricity Consumption and Bill Analysis**

Months	Unit	Amount (Rs.)	Unit Rate (Rs./kW)
Apr-21	1818	27,151/-	50 Units @Rs. 1.40
May-21	1481	23,614/-	
Jun-21	1725	26511/-	150 Units @ Rs 2.10
Jul-21	2706	38,306/-	200 Units @Rs 2.60
Aug-21	2531	36272/-	
Sep-21	2353	34,098/-	2840 Units @ Rs. 3.20
Oct-21	2443	34707/-	
Nov-21	2273	33,364/-	
Dec-21	3098	43,240/-	
Jan-22	2372	34,265/-	
Feb-22	2302	33,004/-	
Mar-22	3634	48911/-	
Avarage	2394.67	34453.58/-	

(Data Source: Electricity Bill Provided by College)

As per the above table, the average monthly Electricity Consumption is 2394.67 Units per month, and The Average Monthly Electricity Bill is Rs. 34453.58/- There are no major fluctuations in Electricity Consumption in the College of Architecture.

### Graph Electricity Consumption and Bill Analysis



## 2.3 Analysis of Connected Load List:

**TABLE 6 COLLECTED LOAD LIST**

Area/ Departments	Tu be	Bu lb	CF L	LED Tube	Ceili ng Fan	Exha ust Fan	A C	Frid ge	Hea ter	Comp uter	Lapt op	Prin ter	Pump / motor	Wat er cool er	Lab Equ ip.	CC TV	Inver ter	Merc ury halog en
<b>B. Voc.</b>	6	0	0	0	2	1	0	1	0	2	0	1	0	0	10	4	0	0
<b>Botany</b>	3	0	0	3	2	0	0	0	0	2	0	1	0	0	4	0	0	0
<b>Chemistry</b>	8	0	0	21	10	9	0	1		0	2	0	1	0	0	0	0	0
<b>Classroom</b>	7	0	0	90	109	0	0	0	0	0	0	0	0	0	0	25	0	0
<b>Commerce</b>	0	0	0	4	2	0	0	0	0	1	0	1	0	0	0	0	0	0
<b>Computer Sci.</b>	0	0	0	10	6	0	1	0	0	63	0	2	0	0	3	1	2	0
<b>Defence &amp; SS</b>	1	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0
<b>Economics</b>	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
<b>English</b>	0	0	0	3	1	0	0	0	0	3	0	1	0	0	1	0	0	0
<b>Examination</b>	0	1	0	13	6	0	0	0	0	5	1	2	0	1	3	2	1	0
<b>Geography</b>	5	0	0	0	3	0	0	0	0	2	0	1	0	0	0	1	0	0
<b>Gymkhana</b>	0	7	8	17	4	0	0	0	0	2	0	2	0	0	0	3	0	8
<b>History</b>	1	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0
<b>IQAC</b>	2	0	0	0	2	0	1	0	0	3	1	4	0	0	1	1	0	0
<b>Jr. Staff room</b>	0	0	0	4	4	0	0	0	0	1	0	1	0	0	0	0	0	0
<b>Ladies Hostel</b>	52	0	8	6	26	0	0	0	0	0	0	0	2 (0.5H P)	1	0	5	1	0
<b>Library</b>	76	0	0	0	55	0	0	0	0	6	0	3	0	1	0	12	1	0
<b>Marathi</b>	1	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0

<b>Mathematics</b>	1	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0
<b>MCVC</b>	11	2	0	0	12	0	0	2	0	3	0	1	0	0	15	0	0	0
<b>Microbiology</b>	4	0	0	0	1	0	0	1	0	1	0	1	0	0	8	0	0	0
<b>NCC</b>	2	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>NSS</b>	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Office 1 &amp; 2</b>	0	0	0	12	8	0	0	0	0	15	0	13	0	0	3	2	0	0
<b>Physics</b>	8	2	0	9	11	1	0	0	0	5	0	1	0	0	2	1	3	0
<b>Political Sci.</b>	1	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0
<b>Staff Quarter</b>	20	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Store room</b>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Tea Club</b>	0	0	0	4	2	0	0	1	0	0	0	0	0	1	0	0	0	0
<b>YCMOU</b>	0	0	0	2	1	0	0	0	0	1	0	1	0	0	0	0	0	0
<b>Zoology</b>	0	0	0	11	0	0	0	1	0	2	0	1	0	0	10	2	1	0
<b>Seminar Hall</b>	0	0	0	13	9	0	0	0	0	0	0	0	0	0	0	0	1	0
<b>Form Section</b>	0	0	0	1	1	0	0	0	0	0	0	0	1 (0.5H P)	0	0	0	0	0
<b>Music Dept.</b>	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Principal cabin</b>	0	0	0	7	4	1	1	0	1	0	1	0	0	3	0	1	0	0
<b>Regist. Office</b>	0	0	0	3	2	0	0	0	2	0	1	0	0	0	1	0	0	0
<b>Canteen</b>	0	0	0	7	1	0	1	0	0	0	0	0	1 (3HP)	0	0	0	0	0
<b>Record Room/ Meeting Hall</b>	0	0	0	4	4	0	0	0	0	0	0	0	0	1	0	0	0	0
<b>Chemistry Research Lab</b>	0	0	0	1	2	1	0	0	0	1	0	0	0	0	0	0	0	0
<b>Washrooms</b>	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Campus/ Porch</b>	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	7
<b>Total</b>	211	12	17	267	310	13	4	7	3	123	6	43	3	8	61	60	10	15



**Observations:**

- The Institute has about 267 LED lights, which is more Energy Efficient than fluorescent tube lights. All LED tube lights are fitted with electronic ballast.
- The Institute has about 17 CFL lights.
- The College has 311 fans in different Classrooms, departments, labs and offices. All fans are fitted with an electronic regulator.





**Observation:**

- Objectives for reducing energy, Water and Fuel consumption are sufficient.
- Energy-efficient equipment's are being used to replace the old non-energy efficient LED Lights.
- Regular monitoring of Equipment and immediate rectification of any problems is being done.

## 2.6 DG Set

**TABLE 7 DG SET**

Sr. No	Rating of DG set (KVA)	Make of DG set	Period of Operation (Hrs.)	Diesel Consumed (Ltrs.)
1	140	Kala Genset Pvt. Ltd.	3/Week	12/Week

### 3. Audit Findings and Recommendation:

Based on the analysis of Power Consumption data, Certain steps have been recommended to improve the campus's energy efficiency. Complete cost analysis of the implementation of the recommended measure has been performed wherever necessary. Also, the general measure of energy efficiency has been listed. Described below are some crucial recommendations for better energy efficiency:

#### 3.1 Consolidation of Audit Findings:

- 1) The communication process for awareness concerning energy conservation is found adequate.
- 2) Average Power factor is maintained.
- 3) The monthly use of Electricity in the College is not very high.
- 4) Objectives for reducing energy, Water and Fuel consumption are sufficient.
- 5) Energy-efficient equipment is being used to replace the old non-energy efficient LED Lights.
- 6) Regular monitoring of Equipment and immediate rectification of any problems.


#### 3.2 Recommendations:

##### 1. Housekeeping:

- **Curtains:** Always keep curtains on windows to prevent direct sunlight inside the room to avoid heating cooled air.
- **Proper insulation:** Good Quality insulation must be maintained in the air-conditions rooms by keeping all doors and windows closed adequately to prevent cool air from going out and Hot air.
- **Operating:** The AC should be switched on 15 minutes before actual use and should be switched off before leaving the room.

##### 2. Replacing Florescent Tube light to LED lights:

LED lighting systems are a good option for College. These systems provide energy-efficient lighting and reduce maintenance costs to a minimum. The College suggests that the College use LED lights instead of fluorescent tube lights. Dominants' light sources at most places on the campus are traditional 36 Watt Florescent



tube lights. As per our data collection, the campus has, in total, Fluorescent Tube lights. If LEDs replace these tube lights, 18 Watts of power can be saved.

#### **4. Use of Master Switch outside each room.**

Installation of a Master switch outside a room can make it easy for a person to switch off all the room's applications in case someone forgets to switch off while leaving the room. This can help improve energy efficiency.

#### **5. Use of Motion sensors in Toilets:**

Toilets have a large potential for saving energy by using automated tools. Motion sensors can be used to switch on the lights when there is no movement automatically. This can gradually be reducing the total load in the toilets.

#### **6. Hibernating**

Utilizing Hibernating feature to power down computers outside of class/work hours will reduce the current wasted Energy associated with keeping computers powered on when the building is unoccupied.

#### **7. Conduct more save energy awareness programs for students and staff.**

Conduct more save energy awareness programs for students and staff.

#### **7. Energy Substitutions:**

As in the Campus, there is a huge consumption of Electrical Energy, which is not economical. Instead of using electrical energy, switch to an alternative energy source, solar power.

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