



**M.V.P.Samaj's  
Arts Science and Commerce College  
Ozar Mig**

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Tal-Niphad,Dist-Nashik  
(MAHARASHTRA)

NAAC Re-accredited "B++" Grade (CGPA 2.77)

**ENERGY AUDIT REPORT  
2021-22**

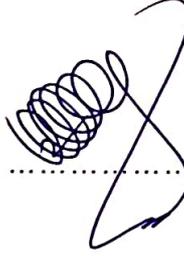
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**ENERGY AUDIT TEAM**

**A) EXTERNAL AUDIT TEAM:**

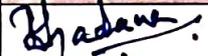
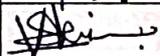
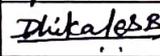
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**B) INTERNAL AUDIT TEAM:**

Sr. No.	Name of Member	Designation	Title in Committee	Sign
1	Dr.P.R.Bhadane	Principal	Chairman	
2	Smt.V.S.Shimpankar	Assistant Professor	Coordinator	
3	Smt.S.B. Dhikale	Assistant Professor	Member	



## *Contents*

<b>1. INTRODUCTION OF THE ENERGY AUDIT</b> .....	5
1.1 About Parent Institution:.....	5
1.2 About College:.....	5
1.2.1 Vision of College:.....	5
1.2.2 Mission of The Institute:.....	7
1.2.3 Objectives of the leadership:.....	7
1.3 Energy Conservation Committee:.....	7
1.4 Function of Energy Conservation Committee:.....	8
1.5 Course offered:.....	8
1.6 Total Population of Campus:.....	8
1.7 Introduction To Energy Oudit:.....	8
1. 8 Objectives of Study :.....	9
1.9 Methodology:.....	10
1. 10 Steps in Energy Audit:.....	10
1.11 Scope of Work:.....	11
<b>2. Energy Consumption Analysis</b> .....	11
2.1 Introduction.....	12
2.2 Electricity Bill Analysis of the College:.....	13
2.3 Analysis of Connected Load List:.....	15
2.4 Analysis of Operating Hours:.....	17
2.5 Study of Month-wise Electricity Bill Variation:.....	18
2.6 Energy Efficiency Improvement.....	18
2.7 Other Energy sources than Electricity.....	18
2.8 Electric Pumping System.....	18
<b>3. Audit Findings and Recommendation:</b> .....	20
<b>3.1 Consolidation of Audit Findings:</b> .....	20
<b>3. 2 Recommendations:</b> .....	20



## *List of Tables*

Table 1 Energy Conservation Committee.....	7
Table 2 Courses offered by College.....	8
Table 3 Total Population of Campus .....	8
Table 4 Basic Information of the College regarding Energy .....	12
Table 5 Electricity Consumption and Bill Analysis .....	13
Table 6 Collected Load List.....	15
Table 7 Analysis of Operating Hours .....	17
Table 8 Energy Saving Measeure .....	<b>Error! Bookmark not defined.</b>

## 1. INTRODUCTION OF THE ENERGY AUDIT

### 1.1 About Parent Institution:

Maratha Vidya Prasarak Samaj is 108 years old renowned education institute in the state of Maharashtra, established in 1914. It was one of the greatest milestones in the pre-independence history of Nashik. The well being in general and education in particular were considered the sole of human being.

The great visionaries of MVP Samaj rightly laid the "Well being & happiness of masses" as the motto for the samaj. The founders of the samaj were inspired and driven by the great work of Mahatma Jyotiba Phule and Rajarhi Shahu Chhatrapati of Kolhapur.

The pioneers, devoted and dedicated team of MVP Samaj includes the names of great social workers and educationalists as -Karmaveer Raosaheb Thorat, Bahusaheb Hiray, Annasaheb Murkute, Ganpatdada More, Kirtiwanrao Nimbalkar, D. R. Bhosale, Vithoba Patil Jadhav. They were the men who envisioned a culture and knowledge centric society.

M.V.P. Samaj manages more than 485 educational & professional institutions. The spectrum of educational institution encompasses Primary Schools, Secondary Schools, Graduate & Post graduate Colleges, Professional & Vocational Colleges. The total strength of students in is over 213598. Under the jurisdiction of University of Pune, Maharashtra University of Health Sciences, MSBTE, M.V.P. Samaj spearheading and propagating education from primary to upper crest management and professional stream like Medicine, Physiotherapy, Nursing, Pharmacy, Engineering, Polytechnic, Architecture and Computer Science etc. The Samaj has strived to create a niche for itself in the world of education, by uplifting the standard of education in the society.

The students & professionals produced by the institutions of MVP Samaj form the real backbone of modern society.

### 1.2 About College:

Maratha Vidya Prasarak Samaj's Arts, Science & Commerce College, Ozar (MIG), Tal-Niphad, Dist-Nashik was established in 1984. The college is affiliated to Savitribai Phule Pune University, Pune. It has been recognized under 2 (f) and 12 B of the University Grants Commission Act, 1956. It receives grants-in-aid. The College is situated in its own spacious and beautiful building on a magnificent and serene campus. It is 2 kilometers away from the Ozar (MIG) Bus Stand, 3 kms away from Ozar Air Port, 20 kms away from the Nashik City



Central Bus Stand, 27 kms from the Nashik Road Railway Station. The College imparts education leading to Bachelor's Degrees in Arts, Science and Commerce and Master's Degree in Hindi, Physics and Chemistry. It has well-furnished and ventilated classrooms, well-equipped laboratories and a rich library, internet facility, adequate number of clean Washroom blocks, play grounds, a health centre, well preserved trees, lawns and landscapes, experienced, qualified and devoted teaching and supporting staff.

The College does its best and most to contribute to National Development through serving the cause of social justice and ensuring equity by providing access to education to socially and economically backward students. Thanks to their education, the students' standard of living is enhanced.

The college does sincere efforts to develop life skills and core competencies among the students which are on par with their counterparts elsewhere, so that they can face the requirements and challenges in the liberalized, privatized and globalized world.

Through appropriate NSS, NCC, curricular and extra-curricular (cultural) activities, the College imbibes appropriate value systems among the students emphasizing universal values like truth righteousness, cooperation, mutual understanding, sense of justice and equity, etc.

We are aware that we live in the era of science, technology and commerce in which traditional methods of delivering education and governance have become less effective and less motivating for the stakeholders in the College. Therefore, through the Information and Communication Technology (ICT) department, internet, intercom, telephone, services the College spreads ICT literacy among the students, teachers and supporting staff and makes them use ICT in all their activities.

We also facilitate distance education through our study centre of YCMOU (Yeshwantrao Chavan Maharashtra Open University), Nashik for the students who cannot do regular courses of the Pune University because of their own reasons. Thanks to this study centre these students' dream of becoming graduates is realized.

In short, this college does whatever it can to develop itself into a centre of excellence. In other words, we quest for excellence in all that we do in and off the college...

The College is accredited in July 2019 with CGPA 2.77 and B++ grade.



Figure 1. –College location and Photograph

### 1.2.1 Vision of College:

To promote educational, social, cultural and economic development of the students and inculcate in them the skills of employability entrepreneurship and balanced emotional growth

### 1.2.2 Mission of The Institute:

WE are committed to provide value based holistic education in the fields of Arts, Science & Commerce with emphasis on individual excellence & social commitment. We focus on continual quality of all the stakeholders

### 1.2.3 Objectives of the leadership:

- To provide quality education to the students from various parts of the society, to make them academically and technically competent
- To improve existing infrastructural facilities of the college
- To create higher levels of intellectual abilities
- To create centres of excellence for research and development and for sharing knowledge and its application
- To lay emphasis on teaching, research and extension activities
- To inspire the students to remain uncorrupted and lead a dignified life
- To lay emphasis on character building by imbibing strong moral characters

### 1.3 Energy Conservation Committee:

Table 1 Energy Conservation Committee

Sr. No.	Name of Member	Designation	Title in Committee
1	Dr.P.R.Bhadane	Principal	Chairman
2	Smt.V.S.Shimpankar	Assistant Professor	Coordinator
3	Smt.S.B.Dhikale	Assistant Professor	Member

## 1.4 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;

## 1.5 Courses Offered:

**Table 2 Courses offered by College**

Name of Faculty	Name of Program	Name of Subject
Faculty of Arts	BA	1. History 2. Marathi 3. Political Science 4. Economics 5. Hindi 6. English 7. Geography
	M.A.	Hindi
Faculty of Commerce	B.Com.	1. Business Administration 2. Marketing and Salesmanship
Faculty of Science	B.Sc.	1. Chemistry 2. Physics 3. Zoology 4. Mathematics
	M.Sc.	1. Chemistry 2. Physics
Vocational	B.Voc.	Electrical

## 1.6 Total Population of Campus:

**Table 3 Total Population of Campus**

Sr.No.	Particulars	Total number
1	College Staff (Teaching and Non-Teaching)	85
2	College Students (Girls and Boys)	1213
	Total	1289

## 1.7 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;*’

### **1.8 Objectives of Study:**

*The objective of an Energy Audit is to balance the total energy inputs with their use and to identify the energy conservation opportunities in the stream. Energy Audit also gives focused attention to energy cost and the cost involved in achieving higher performance with technical and financial analysis. The best alternative is selected on a financial analysis basis.*

#### **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

### 1.9 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 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. 10 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

#### 1.11 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, College of Architecture, Nashik and recommendations for improving the efficient 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 2.2k Watt .

Table 4 Basic Information of the College regarding Energy

Sr.No.	Perticulars	Inputs
1.	Name of College	M.V.P. Samaj's Arts, Science and Commerce College Ozar Mig
2.	Year of Establishment	June 1984
3.	Built up-Area (sq.ft):	8222 sq meter
4.	Sanctioned Load (KVA):	2.2 kwatt
5.	Type of Supply : (1/3 phase)	3 PHASE
6.	Tariff Cat : (Commercial/Domestic)	DOMESTIC
7.	Transformer Distance (in Mtr):	65 METER
8.	List ways that use energy in your College (Electricity, Diesel, Firewood, etc)	ELECTRICITY, , LPG GAS, SOLAR PANNEL ETC
9.	Alternative energy Sources:	Solar Roof Top System
10.	Energy Conservation and Efficiency Implementation Measures :	Use of LED Lights
11.	Year of Implementation:	2016

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

## 2.2 Electricity Bill Analysis of the College:

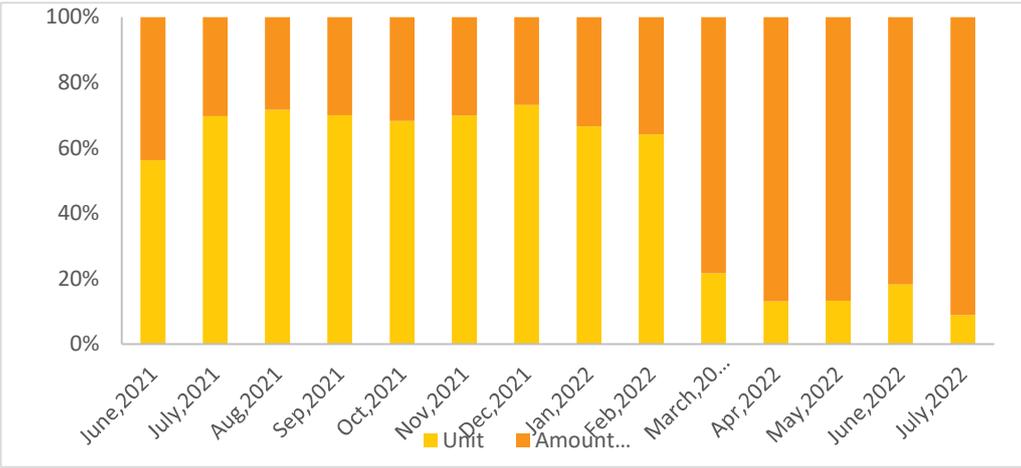
**Table 5 Electricity Consumption and Bill Analysis**

Months	Unit	Total Units	Amount(Rs.)	Unit Rate(Rs./kW)
June,2021	692	32053.6	538.48	50 Units @Rs. 1.40
July,2021	954	33007.2	415	150 Units @ Rs2.10
Aug,2021	1049	34055.8	415	200 Units @Rs 2.60
Sep,2021	967	35022.5	415	2840 Units @ Rs. 3.20
Oct,2021	891	35913.3	415	
Nov,2021	965	36878.7	415	
Dec,2021	1131	38009.5	415	
Jan,2022	828	38837.3	415	
Feb,2022	744	39581.1	415	
March,2022	1110	40691.5	4027.8	
Apr,2022	1168	41859.4	7763.44	
May,2022	1098	42957.8	7190.49	
<b>Avarage</b>	<b>966.42</b>	<b>37405.64</b>	<b>1903.351</b>	

**(Data Source: Electricity Bill Provided by College)**

As per the above table, the average monthly Electricity Consumption is 971 Units per month, and There are greater Electricity saving due to solar roof top system. It reduced monthly electricity bill up to minimum bill. i.e Rs.415/-

### **Graph Electricity Consumption and Bill Analysis**



### 2.3 Analysis of Connected Load List:

Table 6 Collected Load List

Sr. No	Floor	Area/Dept	Room No	Tube Light 40Watt	Light type LED 16/20 Watt	Ceiling Fan (60 Watt)	Exhaust Fan	computers	Printers/Scanner	Freeze	Xerox Machine	Projector
1	B	Classroom B2	B2		6	4						
2	B	Classroom B3	B3		6	4						
3	B	Classroom B4	B4		6	4						
4	B	Classroom B5	B5		6	4						
5	B	Classroom 6	B6		6	4						
6	B	ClassRoom 7	B7		9	6						1
7	G	Staff Room	G28	3	1	2						
8	G	English	G29	1	3	2		1	1			1
9	G	Politics	G30		1	1		1	1			
10	G	Marathi	G31		1	1		1	1			
11	G	History	G31		1	1						
12	G	Economics	G31		1	1		1	1			
13	G	Psychology	G31	1		1		1				
14	G	IQAC Room	G27		5	3		1	1			
15	G	Seminar Hall		2	1	13						1
16	G	Math	G8	2	2	1		2	1			
17	G	IT room	G9	8		2		22	1			1
18	G	Gents Washroom	G10		1	1	1					
19	G	Ladies Washroom	G11		1	1	1					
20	G	Commerce Department	G12	1	3	2		9				
21	G	G13 Class	G13		6	4						1
22	G	Girls Tiolet	G14		1	1	1					
23	G	Boys Washroom	G15		1	1	1					
24	G	Botany	G16	3	5	3		1	1			1
25	G	Research Lab Chem	G17	5	4	2	1					
26	G	Practical Lab I Chem	G18	5	8	2	4					
27	G	Practical Lab II Chem	G18		8	2	1					

28	G	Chem	G19		4	2		1	1			
29	G	Jr Chemistry Lab	G19		8	2	4					
30	G	Zoology	G20		1	1		1	1			
31	G	Practical Lab Zoology	G20		4	2						1
32	G	Office	G24		12	6		8	8			
33	G	Principal Cebin	G25		4	2		1	1			
34	G	Exam	G25		4	5		2	1		2	
35	G	Jr Staff Room	G22	2		1		1	1			
36	G	Stat	G23	2		2		12	1			
37	G	Store Room	G21		1	1						
38	FF	Hindi	F32		2	1		1	1			
39	FF	MCVC(Electronics)	F33	10	0	6		3	1			1
40	FF	Class Room	F34	4	2	2						
41	FF	Geography	F35		7	4		2	1			
42	FF	Guest Room	F36		5	2						
43	FF	Physics Research Lab	F39		3	2		1				
44	FF	Physics	F40		2	1						
45	FF	Phy Sr Lab	F41		8	5						
46	FF	Phy Jr Lab	F42		9	6						
47	FF	Class Room	F53		2	4						
48	FF	ClassRoom	F60		3	2						
49	FF	Class Room	F55 and F54		2	1						
50	FF	Class Room	F 57		1	1						
51	FF	Class Room	F58		4	1						
52	FF	Class Room	F43		3	2						
53	FF	Classroom	F44		3	2						
54	FF	Classroom	F45		3	2						
55	FF	Classroom	F 46		2	1						
56	FF	Classroom	F 47		1	1						
57	FF	Classroom	F48		1	1						
58	FF	Classroom	F 51		1	1						
59	FF	Library	F52		12	12		9	1			
60	FF	B.VocDepartment	F50		3	2		2	1			
61	FF	MCVC	F49		7	4						
62		NCC ROOM	R1		1	1						
63		NSS ROOM	R2		1							
64		Physical Education Department	R3	8	4	1		1	1			

## Observations:

- The Institute has about 223 LED lights, which is more Energy Efficient than fluorescent tube lights. All LED tube lights are fitted with electronic ballast.
- The Institute has about 90FTL lights,
- The College has 164 fans in different Classrooms, departments, labs and offices. All fans are fitted with an electronic regulator

## 2.4 Analysis of Operating Hours:

**Table 7 Analysis of Operating Hours**

Sr.No	Name of Appliances	Power Rating Watt	Quantity	Power Consumption Watt	Uses Per Day	Power Consumption/day (Watt)
1	FTL	40	112	4480	8	35840
2	Fan	68	139	9452	8	75616
3	PC	100	84	8400	8	67200
4	Printer:Standby mode:30-50w/	760	32	24320	4	97280
5	LED16W	16	91	1456	8	11648
6	LED20W	20	91	1820	8	14560
7	Xerox machine	2520	2	5040	4	20160
8	LCDProjector	282	9	2538	4	10152
9	CCTV	29	10	290	24	6960
10	Water Cooler	1440	3	4320	8	34560
11	Water Purifier	18	3	54	8	432
12	TVLED	80	2	160	4	640
13	Loudspeaker	100	1	100	1	100
14	3HP Motor	37000	2	74000	2	148000
15	1HP Motor	746	1	746	2	1492
16	Exhaustfan	60	14	840	8	6720
17	Electricbell	0.5	2	1	1	1
18	Refrigerator (165 litre)	150	2	300	8	2400
19	Refrigerator (213 litre)	260	1	260	8	2080
20	Microwave	1000	1	1000	1	1000

### Observation:

- 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.
- Care should be taken to keep lights in the classroom off and keep them ON whenever necessary.

### *2.5 Study of Month-wise Electricity Bill Variation:*

Sr.No.	Month	Meter 1 (058050065811)		Meter 2 (073020103008)	Consumption	Total Bill Amount
		A	B	C	A+C-B	
		Import (Unit in KW)	Export (Unit in Kw)			
1	July 22	1350	247	150	1253	13321
2	June 22	949	640	150	459	4243
3	May22	1098	469	150	779	7190
4	April 22	1168	485	150	833	7763
5	March 22	1110	535	150	725	4027
6	Feb 22	744	855	150	39	415
7	Jan22	828	958	150	20	415
8	Dec 21	1131	564	150	717	415
9	Nov 21	965	852	150	263	415
10	Oct 21	891	818	150	223	415
11	Sep 21	967	494	150	623	415
12	Aug 21	1049	601	150	598	415
	<b>Total</b>	<b>12250</b>	<b>7518</b>	<b>1800</b>	<b>6532</b>	

## 2.6 Energy Efficiency Improvement

Table 8 Energy Efficiency Improvement

Sr. No.	Recommendations	Annual Saving Potential (Rs.)	Estimated Investment (Rs.)	Pay Back Period (Years)	Remarks (Feasibility)
1.	Solar On-Grid Roof top System	15 kw	900000/-	4.5 or 5yrs	Mid Term

## 2.7 Other Energy sources than Electricity

Sr.No	Department	Kitchen	Connected Electrical Load (kW)	LPG Usage per day (kg)
1	Kitchen	T Club	10*2	500 GM Per Day

## 2.8 Electric Pumping System

Serial no	Motor capacity	Electrical loading	Flow rates in m <sup>3</sup> / hour
1	3 Phase 5HP	10.45 Amp (3.7 kWatt)	156
2	3 Phase 5HP	10.45 Amp (3.7 kWatt)	156
3	1 Phase 1 HP	4Amp (0.73Kwatt)	52

Serial No.	Tank	Capacity ( m <sup>3</sup> )
1	4	5000 liter
2	3	1000 Lier
3	1	2000 liter

**Observations :** Try to get the benefit of the TOD time slot i.e. -01.50 rate at night in addition to the actual rate per unit consumption for electric motor pumping

### 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 no Fluorescent Tube lights. If LED's 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 Washrooms:**

Washrooms 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 Washrooms.

#### **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.

\*\*\*