

## "ENERGY EFFICIENCY ASSESSMENT REPORT"





#### MAHATMA PHULE GRAMIN VIKAS SEVABHAVI SANSTHA, SONWALA'S

## MAHATMA PHULE ADHYAPAK MAHAVIDYALAYA, JALKOT

Near I.T.I. College, In front of 33 KV Substation, Kunki Road, Jalkot, Dist. Latur: 413 532, Maharashtra, India

[Date: 28/02/2024]

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#### **Chapter 1. Introduction**



Fig 1.1 Institute Structure View

A nation is tiring to advance in quantity and quality to the spread of education among the common India and development of their intelligence. In India the entire field of education and other fields of intelligent activities had been monopolized by a handful of men before independence. But today we are marching towards the desirable status of a developed nation with fast strides. But the development should be a sustained one. For achieving such an interminable development energy management is essential. As far as concerning electricity crisis, we are facing lack of electricity during office work. So, institutional management is taking design regarding production of electricity and saving electricity for Eco social aspect. Energy requirement of India is growing and incomplete domestic fossil fuel treasury. The country has motivated strategy to enlarge its renewable energy resources and policy to establish the nuclear power plants. India increases the involvement of nuclear power to largely electrical energy development facility from 4.2% to 9%. India's industrial demand accounted for 35% of electrical power requirement, domestic household use accounted for 28%, agriculture 21%, commercial 9%, and public lighting and other miscellaneous applications accounted for the rest. Energy conservation means reduction in energy consumption without making any sacrifice of 5 quantity or quality. A successful energy management program begins with energy conservation; it will lead to adequate rating of equipment's, using high efficiency equipment and change of habits which causes enormous wastages of energy. By observing all these study lack of electricity and huge electricity demands. It is necessary to plan to be self-sufficient in electricity requirement. In the present study, the college electricity audit has been done. In this study



considered practical laboratory, instrument, Fans, air conditioners, Computers etc are considered in this study. We have studied total budget of the college, total economic investment of college on the electricity and total generation electricity from the solar wind hybrid electricity generation unit. Also, we have studied total saving of electricity and money from solar wind generation and requirement of solar energy. Also, it is studied that exact contribution of bulb, fans, computer, instruments etc in the total requirement of electricity. We studied all these mentioned things by collecting exactly data form survey.

#### **ABOUT THE ORGANISATION:**

Mahatma Phule Adhyapak Mahavidyalay is run by Mahatma Phule Gramin Vikas Sevabhavi Sanstha College of Education Jalkot. Mr. Chandan Shrihari Patil is the Founder member of Trust he is also founder of Mahatma Phule Adhyapak Vidhyalaya Jalkot, Mahatma Phule Public School Jalkot Raje Shivaji Jr. College Wadhawana Bk. Tq. Udgir Dist. Latur all types of degree courses and training institute These Educational foundation created happy educational environment for learners as well teachers. And good infrastructure educational hub also. We look at education differently. For us, education does not lie in the quantification of knowledge. But it lies in the quality of knowledge that helps form the character of students. We believe in this philosophy. This is our passion. And this is the core of Jesuit Education. This is what has made Mahatma Phule Gramin Vikas Sevabhavi Sanstha College of Education Jalkot, climb to the top in the league of colleges in India. Mahatma Phule Gramin Vikas Sevabhavi Sanstha College of Education Jalkot. The building has its own well furnished and equipped chambers, library and labs well maintained ventilated rooms with fan and electricity throughout the day. facilities like Auditorium, Cafeteria, Hospital / Medical Facilities, Hostel, Labs, Library, Sports Complex, Wi-Fi Campus

The College offers a Moderate pollution environment as it's quite lose to the city life. The vision and mission of the college clearly reflects the commitment of the college towards promoting quality and excellence in education to cater to the needs of society & also the main aim to carries the Poor students in the flow of basic education that was clear.

The College always proves excellence through comparable academic results. The College believes in faculty development so that, they can serve better to the students. In Academics Infrastructure is also playing vital role to create the healthy environment for the education.

The institution always believe the external audit to ensure its perfection and quality in the field of excellence in academic and its qualitative process. With this objective Institute has decided to make its quality evaluation by National Assessment and Accreditation Council (NAAC), which will help us to institutional developments and contribution to society's development.

Sr. No.	Basic information	Details
1	Organization Name	MAHATMA PHULE GRAMIN VIKAS SEVABHAVI SANSTHA, SONWALA'S
2	College Name	MAHATMA PHULE ADHYAPAK MAHAVIDYALAYA, JALKOT



3	Postal Address	Near I.T.I. College, In front of 33 KV Substation, Kunki Road, Jalkot, Dist. Latur: 413 532, Maharashtra, India
4	Running Faculties	Bachelor of Education (B.Ed.)
5	Establishment	2000
6	E- Mail	grgaikwad70@gmail.com
7	Phone No. (02559)	9764744602
8	Chairman's/ Directors name	MAHATMA PHULE GRAMIN VIKAS SEVABHAVI SANSTHA, SONWALA'S COMMITTEE
9	Principal Name	Dr. Gaikwad Gautam Ramchandra
10	Purpose	Providing the Various Courses of Graduate Level for the Stream of B. Ed.
11	Affiliation ID: / NCET	Aff.: Ref.SRT-N23-00111 (29/08/2023), NCTE: WRC/APW00774/123108/2015/143862
12	Region Type	Urban
13	Management	Private (Permanent Aided)

Table 1.1: Basic Details of Organization











Fig 2.1: Sample representative Electrical instruments Usage

#### Mission

to impart quality training with commitment to excellence, to create an environment of stimulating intellectual dialogue across disciplines and harvest knowledge with a cutting edge through high quality teaching, research and extension activities leading to the student teachers who would provide leadership and direction to society.

#### **Objectives: -**

- To inspire the faculty and trainees to excel in their studies, teaching, research and activities.
- To train the teacher trainees to meet the various problems and needs of the emerging issues in the global context of the education system.
- To enable teacher trainee for guiding and counseling school students to understand and solve their academic and personal problems.
- Enhancement of various media and library resources to develop skills for effective teaching.
- To encourage the faculty and trainees by providing facilities for research.

#### Vision

MAHATMA PHULE ADHYAPAK MAHAVIDYALAY, JALKOT B.Ed./ M.Ed. college always strive to promote academic excellence and professional ethics in teacher to face global challenges in 21st century.

#### **Philosophy**

Enhancing Knowledge Building Careers Begins from the academia and continues through industry interactions, seminars, conferences, workshops and research. Approach that goes beyond a job to career the art of amalgamating the various talents and qualities in a person and directing it towards the goal of professional success.



#### **Acknowledgement**

Einzigartig International Certifications Private Limited extends gratitude to MAHATMA PHULE ADHYAPAK MAHAVIDYALAYA, JALKOT, for extending us the opportunity to conduct the Energy & Green Audit.

We are thankful to the professors & supporting staff of the college for their transparency & consistent support in sharing relevant information and for providing data about policies and projects along with their other valuable information. This report would not have been possible without their support.

The study team would like to acknowledge the following distinguished personnel's of MAHATMA PHULE ADHYAPAK MAHAVIDYALAYA, JALKOT, in person for the diligent involvement and cooperation.

IQAC coordinator NAAC for motivating us for energy audit



### Chapter 2 Energy Sources

An energy audit is an inspection, survey and analysis of energy flows, 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). In commercial and industrial real estate, an energy audit is the first step in identifying opportunities to reduce energy expenses and carbon footprints.

Energy/Fuel	Please mark in appropriate box	Unit	Consumption (per annum)	Cost Annum (Rs.)
Coal	NA	NA	NA	NA
Lignite	NA	NA	NA	NA
Fuel Wood & Biomass	NA	NA	NA	NA
HSD oil	NA	NA	NA	NA
Light Diesel oil	NA	NA	NA	NA
Furnace oil	NA	NA	NA	NA
LSHS	NA	NA	NA	NA
LPG	NA	NA	NA	NA
	NA	NA	NA	NA
Natural Gas	NA	NA	NA	NA
	NA	NA	NA	NA
Captive (DG Set)		1	2.5 KW	As Per Requirements
MSEDCL			22834	215349/-

Table 2.1: Energy Sources and Consumptions

The total lighting (luminary) load of the college includes fluorescent tubes 06w, CFL Bulb etc. LED lights is good from energy efficiency point of view. LED tube lights are also available in the market, which is also good in terms of energy efficiency point of view. Whenever 36/40w tube gets fuse (not in warranty period) then it could be replaced by 18w/ 9w LED tube. There are 10 nos of streetlights which are working on conventional. power with battery.

During study, tube lights were ON in the classroom, and it was observed that lux level was. good (240-320) in the classroom near to the window. But Lux level was down (120-200) near the entrance door and its wall side. It is advisable to increase some tube lights in the classroom for better lux value.



#### Chapter 3

#### **Introduction to Energy Audit**

#### **3.1 ENERGY AUDIT OBJECTIVE:**

- Our objective is to acquire and analyze the data to find the possible ways of energy Conservation.
- It will be useful to calculate the amount of power consumed and wasted in a network of specified
- To find and implement solutions that is acceptable and feasible.

#### **3.2 Scope:**

- ❖ Data Collection walk through audit.
- \* Facility Description characterize building usage, occupancy, size and construction.
- \* Component Inventory detailed components list including utility, life and efficiency.
- ❖ Energy Conservation Measures identify and evaluate opportunities for cost savings and / economic returns.
- ❖ Renewable /Distributed Energy Measures evaluate economic viability of various renewable/distributed energy technologies.
- ❖ Energy Purchasing and Procurement Strategies perform utility tariff analysis and assess potential for savings from energy procurement strategies.
- ❖ Awareness to create awareness regarding efficient energy consumption and to provide with deserving rewards.

#### 3.3 General

The MAHATMA PHULE ADHYAPAK MAHAVIDYALAYA, JALKOT, entrusted the work of conducting a Detailed Energy Audit of campus at College Premises 2.0 Acres s 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.

#### 3.4 Scope of Work, Methodology and Approach

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.

#### 3.5 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 equipments and system as a whole.



#### 3.6 Energy Audit

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.

#### 3.7 Energy Audit Methodology

Energy Audit Study is divided into following steps

#### • 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.

#### • 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.

#### • 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.



## Chapter 4 **Study of Energy Consumption Profile**

#### 4.1 Source of Energy:

MAHATMA PHULE ADHYAPAK MAHAVIDYALAYA, JALKOT, uses Energy in following forms:

a. Electricity from MSEDCL Ahmednagar Division.

Electrical invertor installed which is run whenever power supply from MSEDCL is not available.

The following are the major consumers of electricity in the facility

- Computers
- Modem
- Router
- **CCTV**
- Lighting
- Printer
- Xerox Machine
- **Projectors**
- Fans
- Sound System
- Other ICT/ROM Equipment (LED Light, electric Motor Etc.)

#### **4.2 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.



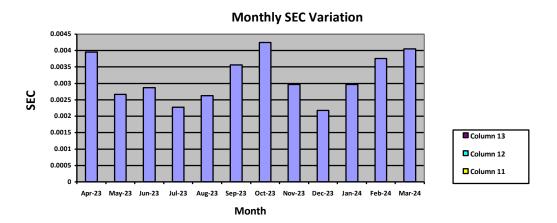


Fig: 4.1 Specific Energy Consumption

#### **Observation:**

- The Specifice Energy consumptions in the months of Oct- 2023 is noted as heighest as it is the days of Scheduled written exams and Online/ Offline Practicals in concern departmental lab.
- Availability of Digital Class rooms, low consumption electricity sources are limited.
- Awareness and implementation of Non conventional energy Sources are poor need to collect trainings regarding



## Chapter 5 Historical Data Analysis

Class No.	Description	Number/Quantity	5 Wattage	<b>Total Wattage</b>
	Fan	2	50	100
			5	100
	LAD BULB 5 Watt	4		20
Office	Printer	2	220	440
	pc	4	220	880
	Thumb Machine	1	12	12
	Wi-Fi router	1	12	12
	CCTV DVR	1	12	12
		1		
	Setup Box	2	12	24
Management	Fan	2	50	100
Cabin	Charger	2	12	24
	LAD BULB 5 Watt	3	5	15
	LAD BULB 5 Watt	4	5	20
	PC	1	220	220
	Printer	1	220	220
EXAM SECTION	Charger	1	12	12
	USB	1	12	12
	RO water purifier	1	260	260
	•			
	LAD BULB 5 Watt	4	5	20
	Fan	3	50	150
Library	PC	1	220	220
	Printer	1	220	220
	charger	2	12	24
	Fan	3	50	150
	LAD BULB 5 Watt	5	5	25
Computer Lab	PC	20	200	4000
_	Printer Dot Matrix	2	220	440
	Fax Machine	1	350	350
	Charger	2	12	24
Classrooms				
1	LAD BULB 5 Watt	6	5	30





	Fan	4	50	200
	Projector	1	400	400
2	LAD BULB 5 Watt	4	5	20
	Fan	4	50	200
	Charger	1	12	24
	PC	1	220	220
3	LAD BULB 5 Watt	6	5	30
	Fan	5	50	250
	Projector	1	400	400
4	LAD BULB 5 Watt	4	5	20
	Fan	4	50	200
	Projector	1		
5	LAD BULB 5 Watt	4	5	20
	Fan	4	50	200
	Projector	1		220
6	LAD BULB 5 Watt	4	5	20
	Fan	4	50	200
	Laptop	1	220	220
	Charger	1	12	12
	Printer	1	220	220
	Wi-Fi Router	1	12	12
Street Light		10	12	120
Boar Well Motor 1		2		440
Boar Well Motor 2		2		440
Diesel Generator Set		1		2.5 KW

Table 5.1: Average Requirement of various Equipment

Average units consumption per month is around 1902.833 kWh Maximum units consumption is 43 kVA in month of Oct-23

- Average bill (Rs.) per month is around 17945.75 Rs.
- Maximum bill (Rs.) is 30187 Rs. In month of Sept-23



#### **5.2. Power Consumption**

SR.	MONTH	UNIT
NO		
1	Apr-23	1728
2	May-23	2183
3	Jun-23	2158
4	Jul-23	1677
5	Aug-23	1528
6	Sep-23	1858
7	Oct-23	1907
8	Nov-23	2369
9	Dec-23	1749
10	Jan-24 1730	
11	Feb-24 1731	
12	Mar-24 2216	
	Total	22834/-

Table 5.2: Unit Consumption per month

#### Study of Variation in UNITS Consumption Month Wise:

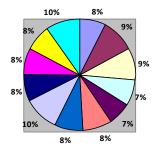




Fig: 5.1 % Variation in UNITS Consumption per Month



## **5.3 Month Wise Billing Composition**

Bill analysis for consumer shown below

Sr. No	Month & Year	Amount
1	Apr-23	14445
2	May-23	18909
3	Jun-23	18781
4	Jul-23	14640
5	Aug-23	13382
6	Sep-23	30187
7	Oct-23	16912
8	Nov-23	20891
9	Dec-23	15856
10	Jan-24	15689
11	Feb-24	15698
12	Mar-24	19959
	Total	215349/-

Table 5.3: Billing Amount per month

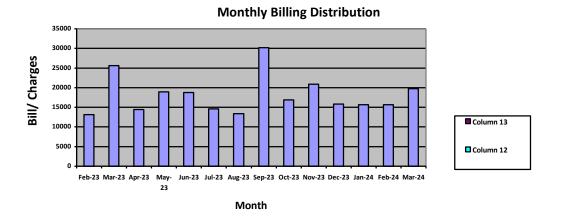


Fig: 5.2 Variation in Monthly charges per Month



Table 5.4: Type wise lighting distribution in college

Type	Qty	KW Load	% Load
LED Light	40	1.088	84 %
T8 TL CC Conventional Lights /CFL	08	0.16	16%
Bulb			
Total	48	0.45	



Fig: 5.3 Percentile lighting distribution

#### 5.4 Total requirement of electricity, generation of electricity using renewable energy sources.

Power requirement met by	Total power requirement	Renewable energy source	Renewable energy
renewable energy sources			generated and used
Installed solar plant	140 KVA	Solar Power Panels	350 Watt/Hr

#### **Experimental and data collection:**

All required data is collected. In building, in every room, how much fans, tubes, fans, computer, instrument AC, etc will these is measured. According to the survey following data is collected.



## **Requirements of NAAC Alternative Energy Initiative**

Percentage of power requirement met by renewable energy sources

- = (Power requirement met by renewable energy sources / Total power requirement) X 100
- $= (0/26.21) \times 100$
- = 0 %

#### Percentage of lighting power requirement met through LED bulbs

Percentage of lighting power requirement met through LED bulbs

- = (Lighting power requirement met through LED Lights / Total lighting power requirement) X 100
- =(0.932/8.892)
- = 10.48 %



# Chapter 6 Study of Actual Measurements and Its Analysis Campus is divided in following section:

- a) Collage Building (3 floors)
- b) Playground
- c) Parking

#### **6.2. Lighting System Observations:**

- It is found that LED, Bulbs, CFLs is installed in the facility.
- It is recommended that some tube lights in this area be switched off when sufficient daylight is available.
- Presently there are no reflectors installed for tube lights.



## Chapter No: 7

#### Conclusion

#### **Observation & Recommendations**

- It is found that LED, Bulbs, CFLs is installed in the facility.
- It is recommended that some tube lights in this area be switched off when sufficient daylight is available.
- Presently there are no reflectors installed for tube lights.
- Future Load Predication: Considering Modern infrastructure & facility which recommended to go Solar Panel or Traditional power.
- Provide Motor guard/ Cover at water tanks to avoid mishaps.
- Use natural ventilation instead fans, as natural air circulation is easy way to reduce electric consumption.
- Recommended that Keep electricity maintenance frequency on record and install power stabilizers to avoid power fluctuations
- Conduct electricity awareness programs amongst the staff and students.
- Recommended that the Playground area street lighting/ Parking area lighting for students' convenience, consider within the proposed solar Power Plant.



## **Chapter No: 8**

## References / Bibliography

- Customer Data
- Customer Light Bill
- Solar Training Module

#### **Bibliography:**

➤ ISO 9001 : 2015

ISO 14001 : 2015

ISO 45001 : 2018

ISO 50001: 2018

MSEDCL Guideline

UGC Guideline

NAAC Guideline



#### Chapter No: 09

#### **Inspection Agency & Auditor Details.**

#### EINZIGARTIG INTERNATIONAL CERTIFICATIONS PRIVATE LIMITED

It is Pleasure introducing ourselves as one of the leading Certification, Training, Third Party Inspection body in India. We serve organizations seeking certifications to International Standard like Quality Management System ISO 9001, ISO 14001, ISO 45001, ISO 27001, ISO 13485, ISO 22000, GMP, HALAL, KOSHER, etc.

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The purpose of our existence is to promote proven International Management System standard across organisation and help them adopt & Implement these standards as systematic approach for overall business operations so that they are globally competitive and profitable

We have experience and resources to carry out certification activities for different sectors of economies in three areas of our system certification domains. Our system assessment method lies and procedures are systematic and process based. We have technically qualified and experienced system auditors to verify that you comply with minimum requirement of the standard. Our Eveready Supportive staff will be guiding you through systematic assessment and certification procedures and you can confidentently deal with us for your management System requirements

With our unblemished credential and unmatched commitment, We assure you that we will be able to offer you best of our services that will help your business excel and remain competitive, cost effective, profitable and socially responsible organization

#### **Auditor Profile**

#### Nilesh Magare

Sr. Consultant, Lead Trainer, Lead Auditor

- Chemical Engineer
- ❖ Lead Auditor ISO-9001 : 2015 Quality Management Systems (TuV Austria & IRCA CQI)
- ❖ Lead Auditor ISO 14001: 2015 Environment Management Systems (TuV India Pvt. Ltd. & IRCA CQI.)
- ❖ Lead Auditor –OHSAS18001:2007 / ISO 45001:2018 Occupational Health and Safety Management Systems (BSCIC & IRCA CQI.)

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- Registered Lead Auditor –ISO-9001 / ISO-14001 / OHSAS 18001 / ISO 45001 with AGSI, EICPL, BSCIC, IQCS, ECPL.
- Lead Auditor EnMS ISO 50000 2018
- Internal auditor for IATF 16949:2016

#### **Jaywant Pagare**

- Sr. Consultant, Lead Trainer, Lead Auditor
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  - ❖ Lead Auditor ISO-9001 : 2015 Quality Management Systems (TuV Austria & IRCA CQI)
  - Lead Auditor ISO 14001: 2015 Environment Management Systems (TuV India Pvt. Ltd. & IRCA CQI.)
  - Lead Auditor –OHSAS18001:2007 / ISO 45001:2018 Occupational Health and Safety Management Systems (BSCIC & IRCA CQI.)
  - Registered Lead Auditor –ISO-9001 / ISO-14001 / OHSAS 18001 / ISO 45001 with AGSI, EICPL, BSCIC, IQCS, ECPL.
  - Lead Auditor EnMS ISO 50000 2018
  - Internal auditor for IATF 16949:2016
  - Certification Head at EICPL
  - Empaneled Third party Inspection channel Partner with China Inspection Agency

#### Snehal Dhengle

QMS/ EHS Auditor, Operation Manager (EICPL)

- Masters in Mechanical Engineering
- ❖ Lead Auditor ISO-9001 : 2015 Quality Management Systems
- ❖ Internal Auditor ISO 14001: 2015 Environment Management Systems
- Internal Auditor –OHSAS18001:2007 / ISO 45001:2018 Occupational Health and Safety Management Systems
- Internal Auditor EnMS ISO 50000 2018
- Internal auditor for IATF 16949:2016
- Certification Head at EICPL



Lead Auditor/Auditor :- Mr. Jaywant Pagare

Signature & stamp :-



Date :- 28/02/2024

CEO/ Representative :- Dr. Gaikwad Gautam Ramchandra

Signature & stamp :-

Date :-

THANK YOU!!!