ENERGY AUDIT

2022-2023

Malabar B.Ed Training College, Peravoor

Authentication

We hereby certify that an energy audit has been conducted for Malabar B.Ed Training College, Peravoor, aimed at evaluating the energy-saving initiatives and sustainable development practices implemented on the campus. The proactive measures and commendable actions taken by the college management in promoting a sustainable environment are highly praiseworthy and deserving of recognition.

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ASSISTANT ENGINEER
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ACKNOWLEDGMENT

We express our sincere gratitude to the management and staff of Malabar Training College for their invaluable support and cooperation during the Energy Audit & Energy Management study conducted.

We would like to extend our heartfelt gratitude to Mrs. Mary EJ, Asst. engineer of Kerala State Electricity Board (KSEB) for their invaluable support and guidance during the Energy Audit & Energy Management study conducted at Malabar Training College.

Our heartfelt thanks also go to the faculty and students for their understanding and patience throughout the audit process. Their willingness to adapt and provide insights was crucial for the successful completion of this study.

EXECUTIVE SUMMARY

Key activities included a comprehensive examination of the college's energy usage, detailed data collection, and an assessment of the efficiency of existing systems and practices. Our team identified several areas where energy consumption could be optimized, including lighting, heating, cooling, and electrical equipment.

The study resulted in several recommendations, such as upgrading to energy-efficient lighting, optimizing HVAC systems, and implementing better energy management practices. Supporting calculations provided a clear projection of potential savings in both energy and monetary terms.

The findings from this audit are intended to support Malabar Training College's management in their efforts to reduce energy consumption and promote sustainability within the institution. The successful implementation of these recommendations will not only lower energy costs but also contribute to the college's overall environmental goals

INTRODUCTION

Energy consumption plays a pivotal role in the operational efficiency and sustainability of educational institutions. Recognizing the importance of energy conservation, Malabar Training College has committed to optimizing its energy usage and reducing its environmental footprint.

The audit, carried out in March 2024, aimed to systematically analyze the current energy consumption patterns and identify potential areas for improvement. The scope of the study encompassed an in-depth review of the college's infrastructure, including lighting, heating, ventilation, air conditioning (HVAC), and electrical systems. The audit also examined existing operational practices to uncover inefficiencies and recommend suitable techno-economic measures for enhancing energy performance.

This report encapsulates the findings of the energy audit, detailing the existing energy use patterns and highlighting areas where energy and monetary savings can be realized. Key observations include the identification of energy-intensive processes, suboptimal equipment, and operational practices that could benefit from modernization or replacement. The recommendations provided are supported by detailed calculations, offering a clear roadmap for achieving significant energy savings.

The insights and recommendations contained in this report are designed to assist the management of Malabar Training College in its ongoing efforts to minimize energy consumption and reduce operational costs. By implementing the suggested measures, the college can achieve substantial improvements in energy efficiency, contributing to both financial savings and environmental sustainability. The ultimate goal is to support Malabar Training College in becoming a model of energy efficiency and responsible resource management within the educational sector.

AIMS AND OBJECTIVES OF AN ENERGY AUDIT

An energy audit is a useful tool for developing and implementing comprehensive energy management plans of an Organization. The aim of an energy audit is to identify the energy efficiency, conservation and savings opportunities at the premises of the audit sites in a systematic manner. The audit process is carried out as per the following.

Review of energy saving opportunities and measures implemented in the audit sites. Identification of additional various energy conservation measures and saving opportunities. Implementation of alternative energy resources for energy saving opportunities and decision making in the field of energy management. Creating awareness among the stakeholders on energy conservation and utilization. Providing a technical information on how to build an energy balance as well as guidance to be sought for particular applications.\Suggesting the energy savings opportunities and implementing the energy management practices to the organizations

STATUS OF THE COLLEGE BUILDING

Malabar Training College has made significant strides in its energy management efforts. However, there remain areas where further optimization and efficiency improvements can be achieved. The following is an overview of the current status of the college regarding electric usage, connections, and systems:

Electric Usage

The college's energy consumption is primarily driven by lighting, HVAC systems, and various electrical equipment used in academic and administrative operations.

Peak energy usage times have been identified, coinciding with the college's operational hours. Certain areas of the college, such as laboratories, computer rooms, and administrative offices, exhibit higher energy intensity due to the continuous use of high-power equipment and air conditioning systems.

Electrical Connections

Malabar Training College is connected to the local electricity grid, supplied by the Kerala State Electricity Board (KSEB). The electrical distribution network within the campus is well-structured, with dedicated lines for different buildings and facilities. The electrical infrastructure includes a mix of old and new installations, with some areas having outdated wiring and switchgear that may require upgrades to enhance safety and efficiency.

Backup power is provided by batteries, ensuring uninterrupted power supply during grid outages, although their efficiency and environmental impact need to be evaluated.

The college predominantly uses ordinary modes of lighting, with some areas having been upgraded to LED lighting for better energy efficiency.There is an ongoing initiative to replace all old lighting fixtures with LED alternatives.

Air conditioning systems are installed in certain rooms, with varying degrees of efficiency. Some units are older and less efficient, contributing to higher energy consumption.

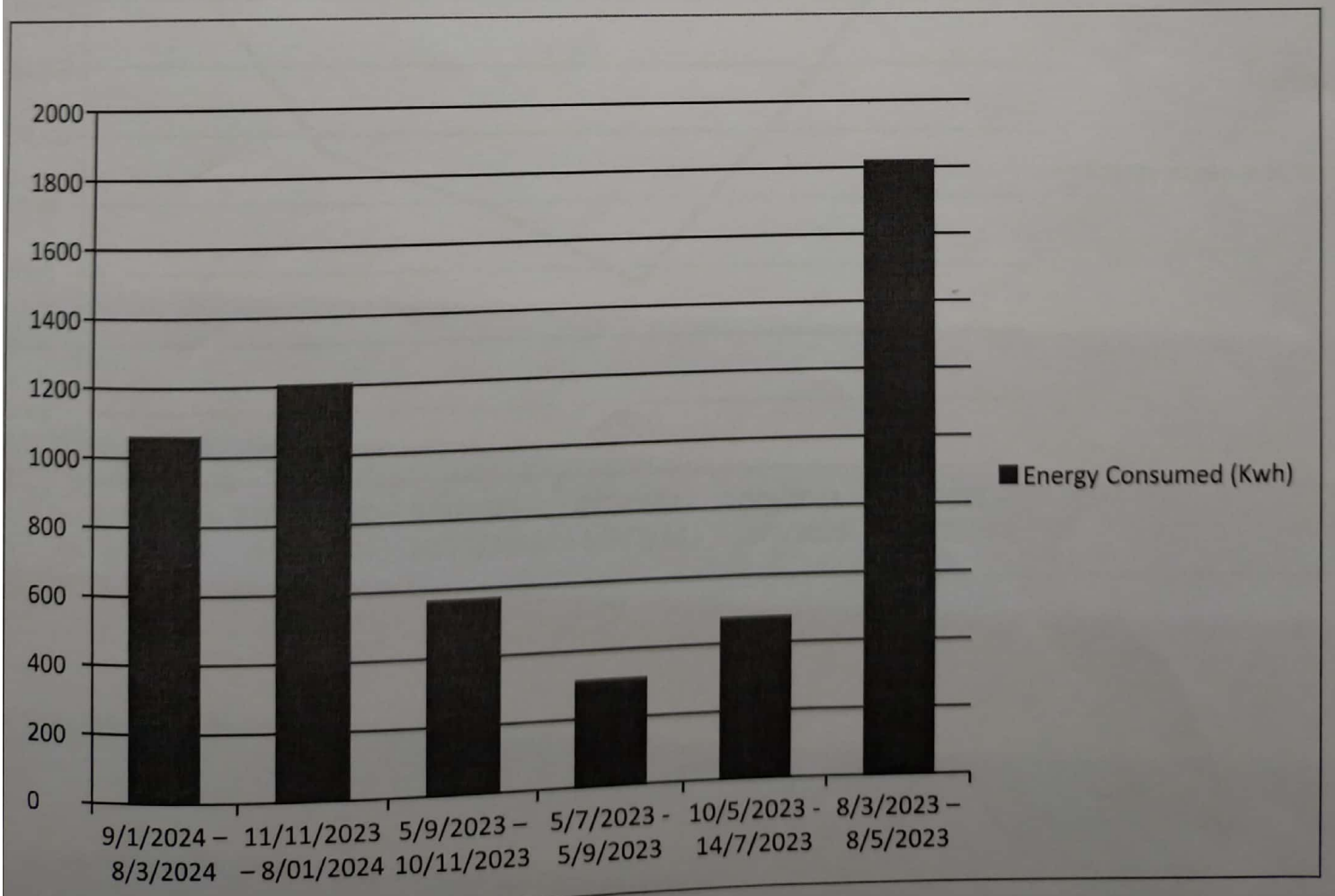
The college uses a range of electrical equipment, including computers, projectors, laboratory instruments, and kitchen appliances. While some equipment is energy-efficient, there are still many old and energy-intensive devices in use. Regular maintenance is conducted on all electrical equipment, but there is a need for a systematic replacement strategy for older, less efficient devices

DISTRIBUTION NETWORK

There is a main electrical panel installed near administration office. All the distribution cables are going from the main panel to all the rooms, submersible pump etc. Sub panels are installed in the buildings. There is a taping on each floor from the raising mains. During the study, it was observed that the conductor size is good according to ampere load. No any conductor was found over heated or its insulation burnt. Adequate size of conductor is going to feed the utility area. So, distribution losses are within the limit.

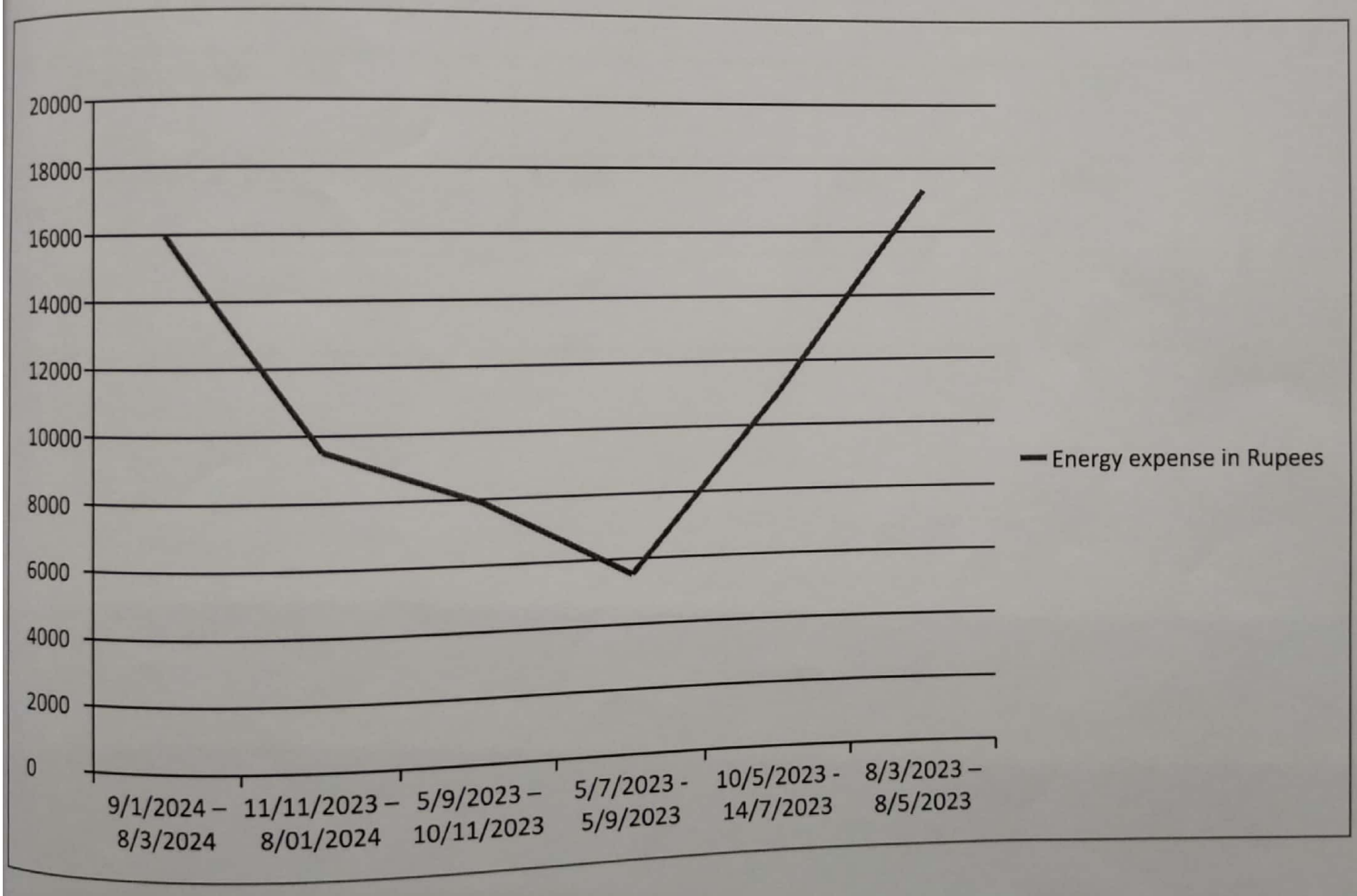
Energy consumption statistics

Period	Energy Consumed (Kwh)
9/1/2024 – 8/3/2024	1064
11/11/2023 – 8/01/2024	1209
5/9/2023 – 10/11/2023	572
5/7/2023 - 5/9/2023	317
10/5/2023 - 14/7/2023	479
8/3/2023 – 8/5/2023	1823



Expenditure on energy

Period	Energy expense in Rupees
9/1/2024 – 8/3/2024	15973
11/11/2023 – 8/01/2024	9521
5/9/2023 – 10/11/2023	7923
5/7/2023 - 5/9/2023	5523
10/5/2023 - 14/7/2023	11006
8/3/2023 – 8/5/2023	17303



List of electrical appliances used in the building

	Components	Number	Watts	Total watts
1	Light	85	15	1275
2	Fan	36	60	2160
3	Plug	30	60	1800
4	Power plug	10	500	5000
5	Air conditioner	1	1200	1200
6	Pump set- bore well	1	1120	1120
7	Pump set- open well	1	1120	1120
8	Computer & components	12 sets	120	1440
Total				15115

CONCLUSION

Over the audit period, the college consumed an average of 918 kWh per two months. The highest consumption was recorded during peak operational months, coinciding with the academic calendar's most active periods. The detailed breakdown of energy usage is as follows:

Mar – May 1823 kWh

May – July 2023: 479kWh

July – September 2023: 317 kWh

September – November 2023: 572kWh

November – January 2024: 1209kWh

January – March 2024: 1064kWh

Expense Analysis:

The cost of electricity for the college averaged 11208.17 Rupees over a two-month billing cycle. The average expense amount is subject to variations depending on seasonal usage and specific activities conducted during these periods.

The proactive measures already undertaken by Malabar B.Ed Training College in promoting sustainable development are commendable. However, by implementing the recommended strategies, the college can achieve substantial reductions in energy consumption and associated costs, further reinforcing its commitment to environmental sustainability. The audit's findings serve as a crucial step towards creating a more energy-efficient and eco-friendly campus.

The audit also included a thorough inventory of the electrical components used across the campus, revealing a number of electrical devices.

RECOMMENDATIONS

Based on the findings, the following recommendations are made to further enhance energy efficiency and reduce costs:

Upgrade Lighting Systems: Complete the transition to LED lighting across all campus areas to reduce energy consumption significantly.

Optimize HVAC Systems: Replace out-dated air conditioning units with more energy-efficient models and integrate smart controls to adjust usage based on occupancy.

Regular Maintenance and Upgrades: Establish a systematic maintenance and replacement schedule for electrical equipment to ensure all devices operate at optimal efficiency.

Implement Energy Management Systems: Introduce real-time energy monitoring systems to track usage patterns and identify areas for further improvement.

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