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Energy Audit Report

SIT Campus

JOINTLY CONDUCTED BY:
Civil Engineering Department, SIT
Electrical Engineering Department, SIT



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Energy Audit

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Abbreviations

AC	Alternate current
KVA	Kilo volt ampere
Kwh	Kilo watt hour
LED	Light emitting diodes
MELEC	Mitsubishi Electric Logic Controller (trade name)
PLC	Programmable logic controller
SIT	Siliguri Institute of Technology
SPV	Solar Photovoltaic
TPLC	Toshiba Programmable Logic Controller (trade name)
WBSEDCL	West Bengal State Electricity Distribution Company Limited

Introduction

Energy Audit & Energy Management system of Siliguri Institute of Technology (SIT) campus, Siliguri, Dist.-Darjeeling, West Bengal, has been conducted during January-February 2023. The study encompassed the examination of the existing pattern of energy use in the SIT campus and identification of areas where energy & monetary savings could be achieved by employing suitable techno-economic measures and good practices. An energy audit may identify energy-saving opportunities along with safety concerns with electrical systems, wiring and ventilation, thus making the campus safer.

Department of Civil Engineering & Electrical Engineering of SIT were entrusted with the task of conducting Energy Audit & Energy Management study for the Siliguri Institute Technology, (SIT). This report gives the details of the observations of the study along with appropriate recommendations. It is expected that the findings of this report will supplement the efforts of the management in bringing the energy consumption of the campus to the lowest possible level. It will also help to understand the energy usage and ways to use energy better.

EXECUTIVE SUMMARY

The summary of the observations and recommendations evolved out of the Energy Audit study of the SIT Campus is given below:-

1. The energy demand of the SIT campus varies from 109 kVA to 351 kVA and the average demand is 232 KVA, whereas the contract demand is 400 KVA. So, it is advisable to reduce the contract demand with WBSEDCL. This may reduce the monthly fixed energy cost. Exact value may be calculated after discussion with WBSEDCL. For precaution, a demand controller may be installed which would help in keeping the maximum running demand within the limit. Stand by electric generator(s) may be used during on-peak high load periods. However, while reduction of demand, future expansion plan may please be kept in mind.
2. The running maximum Demand depends on power factor. The average monthly power factor at SIT campus is 0.899 which is quite satisfactory. However, if the power factor can be improved to 0.99 or unity, it will reduce some amount of fixed cost also. Installation of automatic power Factor controller (APFC) may save some energy cost.
3. Replacement of fluorescent lights with LED lights in SIT campus may save substantial energy cost. Onetime investment of about Rs. 9.28 lakh, with a payback period of 8 months only, may save about Rs.1.24 lakh per month from the 9th months, if all the fluorescent tube lights (40watt) of the buildings of the SIT campus are replaced by LED lights (18 watt).
4. It is estimated that installation of 300 KW roof top power plant in two phases (Phase I-100 KW & Phase II- 200 KW) in SIT campus may generate about 50400 kwh of energy (Phase I – 16800 Kwh & Phase II-33600 Kwh) per month when both the phases would be operational. Out of 50400kwh energy, 20350 kwh may be used for monthly captive consumption and the rest can be sold to grid. However, actual size of the plant will depend upon the local factors like solar radiation and weather conditions and net area of the roof surface, shadow analysis etc.

