

ENERGY AUDIT COMPLETION CERTIFICATE

I, P. EDUKONDALU acknowledge and confirm that the Energy Audit was conducted on 20-02-2023 by the request of Dr. T. C. Ravichandra Kumar, Principal, Sri ABR Government Degree College, Repalle, Andhra Pradesh, India. This report is based on site visits and evidence collected from the site and is issued in accordance with metric 7.1.3 of NAAC Accreditation Manual. All efforts have been made to assess the extent of Energy saving and conservation practices on campus. The focus is on making a positive impact on the environment and society for better living. I will also verify and sign this certificate. We provide this report far beyond legal or mandatory compliance. This report is presented as per the statutory requirements of the NAAC Accreditation Regulations. Any changes, modifications and errors made after site visit are exclusive.


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ENERGY AUDIT

1. INTRODUCTION

The purpose of an energy audit is to quantify electrical energy consumption and recommend where savings are possible. A 'walk through audit' or 'site survey' involves looking at every piece of light and equipment that consumes energy, recording power ratings and estimating operating hours. Obvious energy wastes and inefficiencies are identified as items requiring maintenance or replacement. An action plan for an energy management strategy can be formulated as a result of the audit. For the planning of new and renovated buildings, the audit includes an assessment of all proposed energy consuming equipment, which enables the preparation of an energy budget. An energy audit of Sri ABR Government Degree College campus was conducted with these objectives and to develop an energy management plan for the college.

2. AIM

Conducting energy audit and suggesting energy conservation measures in Sri ABR Govt. Degree College campus.

3. OBJECTIVES

- To assess the current pattern of electrical energy consumption on the college campus
- To know the ways of energy loss
- Suggesting and implementing energy saving program

4. METHODOLOGY

The energy audit was conducted through a walk-through survey of the college campus. College areas are allotted to two groups of two members each.

4.1. SITE SURVEY

In each location, members typically visited the rooms to estimate the number of lamps, the types of lamps (incandescent or fluorescent, CFL and LED) and the lamps' power rating (number of watts) and hours of daily use. The same procedure is repeated for equipment, instruments and other electrical installations. Energy meter readings of the college were taken by a batch of members on all site survey days. The student representatives also collected data regarding the locations and counts of windows, doors, ventilation, bulbs, tube lights, fans and other electrical equipment in the rooms. The college's billing data is also collected (for the last two years), which gives a good picture of how much energy is used in total and how consumption varies -throughout the year

5. RESULTS AND OBSERVATIONS

OUTDOOR LIGHTING IN THE SRI ABR GOVT. DEGREE COLLEGE CAMPUS

Location	No. of light point	Use	Average hours use per day	Remarks	Units used per Day (kWh)	Units used per Month (kWh)	Units used per Year (kWh)
At main Gate Entrance	2-Top LED (36 W)	To light up during the night	10hr	Functioning	0.72	21.6	259.2
Four sides of Main Building	4- Top LED (50 W)	To light up during the night	10hr	Functioning	2.0	60	720
				Total	2.72	81.6	979.2

INDOOR LIGHTING (TUBE LIGHTS -36 W) IN THE SRI ABR GOVT. DEGREE COLLEGE CAMPUS

Location	No. of light point	Use	Average hours use per day	Remarks	Units used per Day (kWh)	Units used per Month (kWh)	Units used per Year (kWh)
Main Building	40	To light up during the usage	4hr	Functioning	5.76	144	1440

INDOOR LIGHTING (CFL - 15W) IN THE SRI ABR GOVT. DEGREE COLLEGE

Location	No. of light point	Use	Average hours use per day	Remarks	Units used per Day (kWh)	Units used per Month (kWh)	Units used per Year (kWh)
Main Building	12	To light up during the usage	4hr	Functioning	0.72	18	180

INDOOR LIGHTING (LED BULBS (20W)) IN THE SRI ABR GOVT. DEGREE COLLEGE CAMPUS

Location	No. of light points	Use	Average hours use per day	Remarks	Units used per Day (kWh)	Units used per Month (kWh)	Units used per Year (kWh)
Main Building	32	To light up during the usage	4hr	Functioning	2.6	52	520

75 WATTS CEILING FANS USED IN THE SRI ABR GOVT. DEGREE COLLEGE CAMPUS

Location	No. of light point	Average hours use per day	Remarks	Units used per Day (kWh)	Units used per Month (kWh)	Units used per Year (kWh)
Main Building	40	6hr	Functioning	18	450	4500

Energy usage by different lab equipments in the Sri ABR Govt. Degree College

Location	Instrument	Power rating (watts)	Average hours use per day	Units used/Day (kWh)	Units used/Month (kWh)	Units used/Year (kWh)
Chemistry lab	2 Weighing machine	10	4	0.08	2	20
Physics Lab	8 Mercury bulbs	100	2	1.6	40	400
Computer and other Lab	81 Computers	50	3	12.15	303.75	3037.5
				13.83	345.75	3457.5

ENERGY USAGE IN THE SRI ABR GOVT. DEGREE COLLEGE CAMPUS

Table showing the energy consumption in Sri ABR Govt. Degree College Campus

Location	No. of light point	Units used per Day (kWh)	Units used per Month (kWh)	Units Used per Year (kWh)
Outdoor lighting	6	2.72	81.6	979.2
Indoor lighting Florescent bulbs	40	5.76	144	1440
Indoor lighting CFL bulbs	12	0.72	18	180
Indoor lighting LED bulbs	32	2.6	52	520
Fans	40	18	450	4500
LABS	3	13.83	345.75	3457.5
ACS	2	8	200	1200
Motors for water distribution	1	4	100	1100
Refrigerator	1	1	25	250
RO Plant	1	2	50	500
		58.63	1466.35	14126.7

Table showing the Actual energy consumption and solar power generated in Sri ABR Govt. Degree College Campus

Month & Year	Total Energy Units Consumed	Total Energy Units Generated by solar plant	Difference
Sep-21	873	877	-4
Oct-21	906	740	166
Nov-21	853	781	72
Dec-21	957	482	475
Jan-22	638	751	-113
Feb-22	591	841	-250
Mar-22	614	820	-206
Apr-22	988	488	500
May-22	992	798	194
Jun-22	1170	122	1048
Jul-22	2095	0	2095
Aug-22	3033	0	3033
Total	13710	6700	7010

As all the rooms have fans, most of the energy is consumed by the fans. There are a large number of fluorescent bulbs in the building. LED bulbs are more energy-efficient and help reduce greenhouse gas (GHG) emissions. They are cost effective, efficient, mercury free, durable and long lasting. Replacing tube lights and CFLs with LED bulbs can greatly reduce energy consumption levels. Mercury lamps, halogen lamps, CFL, LED bulbs are used inside the campus, all these forms are responsible for energy saving. A good practice of energy conservation found in the college campus is the use of solar energy. Replacing the entire campus with this natural energy will reduce the overall energy consumption rate, as well as pollution levels. A total of 979 units of electricity is consumed annually for the purpose of outdoor lighting. Daily power consumption for working of various equipments in college labs is 3458 units per annum. As per estimations average annual per capita energy consumption in the college is 14127 units per annum. 40 tube lights are still in use in the college. Interestingly, the college has 12 CFL and 32 LED lamps. Actual energy consumption per annum is 13170 units. By the use of solar power plant, we are generated 6700 unit's power and reduced the proportional pollution in the environment generated by power plants.

6. CONCLUSION AND RECOMMENDATIONS

In the energy audit conducted at Sri ABR Government Degree College, it was found that fans consume the most electricity. The usage pattern of ceiling fans also contributes significantly to the high cost of electricity. Age and condition of fans should also be checked and controlled for significant reduction in energy consumption. Outdoor energy consumption can be significantly reduced by using solar lights in all such areas. By this measure it is important to save about 979 units Per annum. Indoor lighting is dominated by tube lights and LEDs. It is high time to replace all tube lights with LED lamps, which will save about 1440 units of electricity per year (10.2% of current consumption). Usage pattern should be checked in case of equipment and tools. Equipment power ratings should also be rechecked and ECM elements should be included in future purchases. An energy conservation education campaign covering all staff, students and teachers should be conducted in the college. A second round of energy audit should be conducted after implementing the suggested conservation measures. That will change Sri ABR Govt. Degree College Campus has become a true green campus.



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