CHATRAPATHI SIVAJI TRI SATA JAYANTHI GOVT. KALASALA



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ENERGY AUDIT REPORT







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Objective:

The primary objectives of energy audit are to identify and evaluate opportunities to reduce energy consumption per unit of product output and reduce operating costs through energy conservation and planning. Energy audit produces a bench-mark for managing energy in the institution and also provides the basis for planning a more effective use of energy throughout the institution. This auditing is an attempt to consume electrical power in our college. Department of Physics is effectively performing this auditing for this year i.e in the month of June, 2024.

Scope:

The scope of the energy audit includes an examination of the following areas,

Energy distribution network of electricity, water, Air Conditioners, fans, lights

(LED and CFL), Xerox machines, computers, projectors, cameras, bore-well motors and refrigerator.

- > Energy utilization efficiency of all equipment's and buildings.
 - > Efficient planning, operation, maintenance and housekeeping.

Preface:

Data collection for energy audit of the Govt. Degree College, Jangareddigudem Campus was conceded by Physics Department team from 01/6/2024 to 30/6/2024. This audit was over sighted to inquire about convenience to progress the energy competence of the campus. To drop the energy utilization whilst cultivate or humanizing comfort, health and safety were of prime anxiety. This audit required to recognize mainly energy proficient appliances. Besides, many each day processes concerning common appliances have been provided which facilitate sinking the energy expenditure. Students of Physics department were very helpful in completing the energy audit survey, which included all data that was collected from each classroom, laboratory and other miscellaneous rooms as well. The electrical equipment's and appliances that were taken under consideration included total no. of lights, fans, A.Cs, electronic instruments, and etc. in each room, chamber, corridor area and etc., together with the unit of electrical power that would be consumed by each of the component in the total electricity consumption.

Acknowledgements:

We are very thankful to Principal of this college for giving this opportunity to conduct energy audit of various facilities in college campus. We are also thankful for Vice Principal, various department in-charges, Staff members, their respective subordinate staffs and nonteaching staff who have given their valuable contribution in guiding & supporting us during campus survey for data collection, network study & measurement for accomplishing successful Energy audit.

This report made with sincere efforts gives details of the relevant data collected during energy audit study, observation, analysis & recommendations made pertaining to different facilities in our campus. Several Energy Conservation measures have been identified & proposed in course of our study & these options when implemented, are expected to bring in lasting benefits (saving) in terms of energy as well as cost saving to the college funds.

We are very much delighted in submitting this Detailed Energy Audit Report to our Principal Garu and thanking him for the implementation of identified Energy Conservation Opportunity as well as recommendations, after sincere study & observations.

About the College:

I deem it an honour and privilege to present a brief overview of Chatrapati Shivaji Tri Satajayanti Kalasala, also known as CSTS Govt. Kalasala. It is a co-education Degree College situated in Jangareddigudem, in Eluru District of Andhra Pradesh. The College was founded by Chintalapati Vara Murty Raju garu, a freedom fighter, Sarvodaya Leader, under the banner of Bapi Raju Dharma Samsthalu in 1974 in an area with an extent of 16 acres. Shri Murty Raju garu was known as the Godavari Gandhi and as a political sage of the yester years.

The students, who pursue education in this College at UG level, hail from the most backward, remote, rural and primitive regions in the state of Andhra Pradesh. Moreover, a significant chunk of the student populace happens to be the first-generation learners. Fostering the all-round development of these pupils by catering to their academic, co-curricular and extracurricular needs with focus on games, sports, cultural and skill enhancement remains to be the prime endeavour of the College. To put it in a nutshell, nurturing the holistic change among the students is envisaged as the chief motto and objective of this institution.

Name	Designation	Department	College
T.V. Rambabu	Lecturer in Physics		
P. Vigneswara Rao	III B.Sc., M.P.C Student		CSTS GDC,
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Energy audit team:

Need of energy audit:

Natural resources on earth are limited and consuming very sharply. It can be saved by employing energy efficiency and it is very necessary to prevent depletion of natural resources. The Electrical Energy Audit of college buildings showed that the load of electrical equipment's been significant and should be taken some necessary step for reducing energy conservation. Today, energy conservation plays a very important role for energy conserving because energy consumption is increasing day by day but the natural resources are not increasing and also production is cannot meet the consumption. People should aware about energy conservation and reduce energy consumption by adopting modern technologies.

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). The task of energy audit undertaken by CSTS Govt. Degree College has objective to identify energy saving & conservation opportunity with electrical network & equipment load study with measurement & conservation opportunity to save input energy cost.

Experimental and data collection:

The energy audit was conducted from 01.06.2024 to 30.06.2024 and reviewed implementation of energy saving & conservation opportunity already identified as well as quantified it.

- 1) Inventory of various electrical load.
- 2) Electricity Board bill study& working out average cost of power.
- 3) Identification of various energy conservation measures & saving opportunity.

In this present report, college electricity audit has been executed and verified. Physics department student teams headed by a faculty was formed and allotted for data collection and the entire campus was surveyed in the same way for the audit. In this survey, Main Block, Science Block, Commerce Block, Arts Block and Common Areas were involved. In all building, each and every room was examined to note, the no. of fans, tube lights, computer, instrument AC, etc. The electrical equipment's that were put forth for the energy audit include practical laboratory, instrument, fans, air conditioners, Computers and etc., for this study.

We've calculated the exact contribution of energy consumption with respect to units consumed by each of the equipment such as, lights, fans, computers, instruments and etc., in comparison with the total requirement of electricity. We've studied all these above mentioned electrical equipment's by collecting exact data from our survey. The Survey details are given elaborately, as below.

Calculation of Energy Consumption in kWh

Electric energy or power consumption can be calculated using the following basic formula.

Energy Consumption in Watt-hours=Power Rating in Wattage x Time in Hours

$$\mathbf{E} = \mathbf{P}\mathbf{x} \mathbf{t} \quad \dots \quad (\mathbf{W}\mathbf{h})$$

"Wh" is a small unit to measure the energy usage. To convert it to the basic electricity unit i.e.

1000 Watts per hour = 1kWh = 1 Unit of electricity, we divide it by 1000 i.e.

 $E = Px t \div 1000$... (kWh)

Where:

E= Electric Energy (Consumed power in kWh) P=Power in Watts t=Time in hours per day

Daily Energy Consumption

Power Consumption (Daily)=Power Usage(Watts) x Time(Hours)

Example: A70 watts fan used for 5hours daily. The daily watt hour and kilowatt hour

consumption is as follows.

Daily power usage in Wh =70Wx5 Hours =350 Wh /day Daily power usage in kWh = 350 Wh/1000 =0.35kWh /day

POWER CONSUMPTION OF COLLEGE AS PER ELECTRICAL DEPT.

The following are the past six months consumption of electrical energy as per bills:

Name of the Consumer: Principal, CSTS GDC, Jangareddigudem, Eluru Dt.

Consumer Number: 1552771775008234

Sl. No.	Month	Consumption Unit/s (KWh)
1.	January, 2024	1260
2.	February, 2024	1312
3.	March, 2024	1539
4.	April, 2024	1201
5.	May, 2024	1387
6.	June, 2024	1477
Averag	e:	1363 Units

Result and Discussion:

An energy audit is an analysis of a facility, indicating how and where that facility can reduce energy consumption and save energy costs. Its insight to energy efficiency and conservation can lead to significant savings on the Institution's utility bill. In an attempt of this, we have collected data by considering the total no. of tube lights, fans, computers, printers, A.C's and other electrical instruments together with the electrical unit that each of the equipment would consume.

Energy saving through LED lights:

Total No. of conventional Tube Lights in Campus = 42 Conventional Tube Light average power = 36 W. LED Tube Light average power = 20W. Difference in power saved per Tube Light = (36-20)W=16W. Total Power saving = 42*16W = 672W = 0.672 kW. Average Use of Tube Light per year = 270*8h=2160h. Energy saved per year=0.672*2160kWh=1451.5kWh. Saving in Rs. per year = 1451*9.5 = Rs.13,785-00LED tube light average cost = Rs. 450 Total cost of replacing all conventional tube lights = 42*450=Rs.18900-00.

Suggestions:

We can use LED bulbs to save more electricity. The electrical devices which are connected in college campus are not energy saving devices. These devices can be replaced by electrical efficient appliances. The appliances are of high watt equipments so the electrical consumption is high in our degree college campus. Now-a-days, low wattage appliances are used in building; they are productive in saving electricity. Some appliances are replaced by energy saving appliance which are as follows.

- Tubes and CFL's werere placed by LEDs.
- Normal Fans and Wall fans were replacedby5-star Fans.
- Outdoor lights were replaced by LED lights.
- Normal PCs were replaced by7thgen PC's.
- CRT monitors are replaced with LCD/LED Monitors.
- Separate electrical connection of administrative office, Computer Labs and classrooms were undertaken.
- Master switches for each Room to shut down power of entire room when not in use.

Inference:

Ultimately, the data generated in energy audit gave a clear picture of the energy distribution and utilization of power in the college. On the whole, our college needs maximum of 1336874 Watt Hour of (equivalent to 1337 Units/month) of electrical energy.

				No. o	f electrical e	quipment avai	lable		
Room description	Fans (70 W)	Tube Lights (36w)	LED tube lights (20w)	A.C 1.5 ton	Fridge	Computer /s	Printer/ s	Motor	Digital TV
Principal Room	5	1	5	1	1	1	1	1 (1HP)	0
Conference Hall	8	0	8	0	0	0	0	0	1
Chemistry Lab	2	8	0	0	0	0	0	0	0
Commerce Department	7	4	0	0	0	20	1	0	1
Library room	5	0	8	0	0	5	0	0	0
Office room	5	5	0	0	0	4	3	0	0
Computer Lab	15	0	9	0	0	18	2	0	1
Eng. Lang. Lab	6	6	2	0	0	25	1	0	1
Staff Room1	3	1	3	0	0	0	0	0	0
Staff Room2	4	1	3	0	0	1	1	0	0
Girls Waiting Room	0	0	5	0	0	0	0	0	0
B.A Class room1	4	2	0	0	0	0	0	0	0
BA Class room 2	3	2	1	0	0	0	0	0	0
B.Com. Class room1	3	1	1	0	0	0	0	0	0
B.Com Class room2	0	0	1	0	0	0	0	0	0
BCom Class room3	3	0	1	0	0	0	0	0	0
B.Sc. Class room 1	3	0	2	0	0	0	0	0	0
B.Sc. Class room 2	3	1	1	0	0	0	0	0	0
B.Sc. Class room 3	3	0	3	0	0	0	0	0	0
Zoology Lab	3	4	1	0	0	1	1	0	0
Botany Lab	2	2	2	0	0	0	0	0	0
Physics Lab	3	4	3	0	0	1	1	0	0
Total quantity	90	42	59	1	1	76	11	1	4

<u>ANNEXURE</u>

Total power consumption(W) in l hr	6300	1512	1180	1500	42	646	275	746	400
consumption in 5 hrs (per day)	3150 0	7560	5900	7500	210	3230	1375	1492	2000
Consumption in 1 month (Wh) (22days)	693 000	16632 0	12980 0	165 000	4620	71060	30250	32824	44000

CERTIFICATE

Certify that we audit the electrical equipment available in our college and their average usage and calculate for average 22working days per month. All the above data is true in the best of our knowledge.

Audit Team:

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Sv. Madue .
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Principal

CSTS Govt. Kalasala Jangaredeigudem-534447 Eluru Dist., A.P

Counter Signed by

Assistant Engineer Operation: A.P.E.P.D.C L JANGAREDDYGUDEM

IN-CHARGE Department of Physics GDC, Jangareddigudem