

"Ye shall know the truth and the truth shall set you free" St. John 8 : 32

Andhra Christian College, Guntur

(DAY, EVENING & P.G.)

Accredited with 'A' Grade by NAAC

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ENERGY AUDIT OF ANDHRA CHRISTIAN COLLEGE, GUNTUR

Date: 11-01-2023

1. INTRODUCTION

The purpose of this energy audit is to quantify electrical energy consumption and recommend where savings are possible. It is carried out by a 'walk through audit' that involves examining every item that consumes electric energy, estimating power ratings, operating hours and preparing electric energy budget. Energy wastage and inefficiencies in use of electrical and electronic items are identified as well those requiring maintenance or replacements are identified. Action plan for an energy management strategy will be designed following the audit.

2. AIM

Conducting Energy Audit and to evolve energy conservation measures in Andhra Christian College, Guntur, Guntur district.

3. OBJECTIVES

- To assess the current pattern of electrical energy consumption on the college campus.

- To know energy losses.
- Suggesting and implementing energy saving methods.

4. METHODOLOGY*

The energy audit was conducted through a walk-through survey of the campus of Andhra Christian College, Guntur, Guntur district. College areas are allotted to four groups of two members each.

4.1. SITE SURVEY

In every room and outside, members physically visited the rooms and estimated the number and type of lights, i.e., incandescent, fluorescent, CFL and LED, and the lights power rating i.e., number of watts and hours of daily use are estimated. The same procedure is carried out for other electrical items computers, Printer and LCDs. Energy meter readings of the college were taken for this purpose.

CALCULATION OF AVERAGE ELECTRICAL ENERGY CONSUMPTION PER DAY

Location (Room No./ Varandah / Open space / Main Gate	Description of electrical equipment	Quantity	Wattage of the each equipment (in Watts)	Average No. of hours used per day (in hours)	Electrical energy consumption per day (kWh)
Principal's Office	LED lights	11	20	7	1.54
	Air Conditioner	1	1500	7	10.5

	Ceiling Fans	4	75	7	2.1
	LED Monitor	1	60	7	0.42
	Printer	1	250	2	0.5
	Fridge	1	167	5	0.835
	Stand Fan	1	75	0.1	0.0075
Manager's Office	LED lights	4	20	5	0.4
	Ceiling Fan	2	75	5	0.75
Main Office	Tube Lights	3	40	7	0.84
	LED lights	5	20	7	0.7
	Desktop computers	3	150	7	3.15
	Printers	2	250	2	1
	Xerox machine	1	250	2	0.5
Men's staff room	Ceiling Fans	4	75	5	1.5
	Tube lights	7	40	5	1.4
	LED light	3	20	5	0.3
Ladies waiting room	Ceiling Fans	3	75	5	1.125
	LED lights	7	20	5	0.7

IQAC Room	Ceiling fan	1	75	2	0.15
	Tube Lights	2	40	2	0.16
	Desktop Monitor	1	150	1	0.15
CRESTE Room	LED Lights	8	20	5	0.8
	Ceiling Fans	4	75	3	0.9
	Air Conditioner	2	1500	3	9
	Desktop Monitor	1	150	5	0.75
	Printer	1	250	1	0.25
Room No 1	LED lights	4	20	5	0.4
	Ceiling Fans	2	75	5	0.75
Room No 2	LED lights	3	20	5	0.3
	Tube lights	3	40	1	0.12
	Ceiling fans	4	75	3	0.9
Room No 3 (Virtual Lab)	Ceiling Fans	6	75	2	0.9
	LED Lights	17	20	1	0.34
	LCD projectors	2	100	1	0.2

Room No 4 (Digital Lab)	LCD projectors	3	100	1	0.3
	LED Lights	17	20	1	0.34
	Ceiling Fans	6	75	1	0.45
	Desktop computers	30	150	2	9
	Television	1	40	0	0
Room No 5	Ceiling Fans	2	75	1	0.15
	Tube Light	1	40	1	0.04
	LED Lights	3	20	3	0.18
Room No 6	Ceiling Fans	2	75	1	0.15
	LED Lights	3	20	3	0.18
Room No 7	Ceiling Fans	2	75	1	0.15
	LED Lights	1	20	3	0.06
	Tube Lights	2	40	1	0.08
Room No 8	Air Conditioner	1	1500	0.1	0.15
	CFL Lights	7	20	0.2	0.028
	Ceiling Fans	6	75	0.5	0.225

	Desktop computers	10	150	1	1.5
	Stand Fan	1	75	0.2	0.015
	LCD Projector	1	100	0.2	0.02
Room No 9	Ceiling Fans	2	75	2	0.3
	Tube Lights	3	40	2	0.24
	LED Lights	1	20	3	0.06
Room No 10	Ceiling Fans	2	75	2	0.3
	Tube Lights	1	40	2	0.08
	LED Lights	3	20	3	0.18
Room No 11	Ceiling Fans	2	75	2	0.3
	Tube Lights	1	40	2	0.08
	LED Lights	3	20	3	0.18
Room No 12	Ceiling Fans	2	75	2	0.3
	LED Lights	5	20	3	0.3
Correspondent Room	Air Conditioner	1	1500	0.2	0.3
	LED Lights	4	20	0.1	0.008

Assembly Hall	Focus Lights	7	500	0.1	0.35
	LED Lights	16	20	1	0.32
	Ceiling Fans	19	75	0.5	0.7125
	Bulbs	6	40	2	0.48
Library	LED Lights	18	20	5	1.8
	Tube Lights	28	40	2	2.24
Library	Ceiling Fans	20	75	5	7.5
	Stand Fans	2	75	0.5	0.075
Room No 40	Ceiling Fan	2	75	2	0.3
	Tube Light	2	40	2	0.16
Room No 41	LED Lights	2	20	2	0.08
	Ceiling Fan	1	75	2	0.15
Room No 42	Tube Light	2	40	2	0.16
	Ceiling Fans	2	75	2	0.3
Room No 43	Tube Light	2	40	2	0.16
	Ceiling Fans	2	75	2	0.3
Room No 46	Tube Light	1	40	5	0.2
	Ceiling Fans	2	75	5	0.75

Room No 47	Tube Light	3	40	5	0.6
	Ceiling Fans	2	75	5	0.75
Evening college corridor	Tube Light	7	40	2	0.56
Room No 48	Ceiling Fans	3	75	3	0.675
	LED Lights	4	20	3	0.24
Room No 49	Ceiling Fan	3	75	3	0.675
	LED Light	1	20	3	0.06
Room No 50	Ceiling Fan	2	75	3	0.45
	LED Light	1	20	3	0.06
Room No 51	Ceiling Fan	1	75	3	0.225
	LED Light	1	20	3	0.06
Room No 52	Ceiling Fan	1	75	3	0.225
	LED Light	1	20	3	0.06
Room No 53	Ceiling Fan	2	75	3	0.45
	LED Light	3	20	3	0.18
Room No 56	Ceiling Fan	2	75	3	0.45

	LED Light	3	20	3	0.18
Room No 59	Ceiling Fan	2	75	3	0.45
	LED Light	4	20	3	0.24
	LCD Projector	1	100	2	0.2
Room No 83	Ceiling Fan	3	75	5	1.125
	LED Light	4	20	5	0.4
	LCD Projector	1	100	2	0.2
Botany dept Museum	Tube Lights	3	40	2	0.24
	LED Lights	2	20	2	0.08
	Stand fans	4	75	2	0.6
	LCD projector	1	100	2	0.2
Botany Men's Staffroom	Tube Lights	2	40	3	0.24
	LED Lights	1	20	5	0.1
	Ceiling Fans	2	75	5	0.75
	Stand Fans	2	75	0.5	0.075
	Fridge	1	167	5	0.835

	Desktop computer	1	150	3	0.45
Botany Ladies Staffroom	LED Lights	1	20	3	0.06
	Tube Lights	2	40	3	0.24
	Ceiling Fans	2	75	5	0.75
	Desktop computer	1	150	2	0.3
Botany Head Room	Tube light	2	40	2	0.16
Botany Head Room	Ceiling Fan	1	75	2	0.15
Botany – Microbiology Lab	Air Conditioner	2	1500	1	3
	Tube Lights	5	20	2	0.2
	Ceiling Fan	3	75	2	0.45
Botany – Inter Lab	LED Lights	6	20	2	0.24
	Ceiling Fans	6	75	2	0.9
	Tube Lights	12	40	2	0.96
Botany – Degree Lab	LED Lights	8	20	2	0.32

	Ceiling Fans	7	75	2	1.05
	LCD projector	1	100	0.5	0.05
	Tube lights	20	40	2	1.6
Botany – Library	Tube lights	3	40	1	0.12
	LED Light	1	20	1	0.02
Zoology Dept Museum	Ceiling Fan	2	75	2	0.3
	LED Lights	1	20	3	0.06
	Tube Lights	4	40	2	0.32
Zoology Staffroom	Tube Lights	2	40	2	0.16
	LED Lights	2	20	2	0.08
Zoology Head room	Tube Light	3	40	2	0.24
	Ceiling Fan	1	75	2	0.15
Zoology – Inter Lab	Tube Lights	26	40	1	1.04
	Ceiling Fans	6	75	1	0.45
Zoology – Degree Lab	Tube Lights	24	40	1	0.96
	LED Lights	3	20	2	0.12
	LCD Projector	1	100	1	0.1

Room no 24	Tube Lights	13	40	1	0.52
	LED Lights	1	20	2	0.04
	Ceiling Fans	4	75	2	0.6
P.G. Zoology	Ceiling Fans	12	75	2	1.8
	Stand Fan	1	75	1	0.075
	Tube Lights	20	40	2	1.6
	Fridge	1	167	1	0.167
B.Com Staff room	Ceiling Fans	2	75	2	0.3
	Tube Lights	2	40	2	0.16
Seminar Hall	Ceiling Fans	11	75	2	1.65
	LED Lights	8	20	2	0.32
	Tube Lights	16	40	2	1.28
	Air Conditioner	6	1500	0.2	1.8
M.Com (Final Classroom)	Ceiling Fans	4	75	2	0.6
	Tube lights	4	40	2	0.32
M.Com 1 st Year Classroom	Ceiling Fan	4	75	3	0.9
	Tube Lights	4	40	2	0.32
M.Com Staffroom	Ceiling Fans	2	75	3	0.45

	Tube lights	2	40	3	0.24
Maths Dept Staffroom	LED lights	6	20	3	0.36
	Ceiling Fans	2	75	3	0.45
	Fridge	1	167	2	0.334
Maths Headroom	Tube lights	2	40	5	0.4
	LED light	1	20	5	0.1
	Ceiling Fans	3	75	5	1.125
	Printers	2	250	0.5	0.25
Maths Headroom	Desktop Computer	1	150	3	0.45
	Xerox Machine	1	250	0.5	0.125
Chemistry Dept Lab – 1	Tube lights	28	40	2	2.24
	Ceiling Fans	4	75	2	0.6
Chemistry Storeroom	LED lights	4	20	1	0.08
	Tube lights	4	40	1	0.16
	LCD projector	1	100	1	0.1
	Ceiling Fans	6	75	1	0.45

Chemistry Seminar Hall	Tube Lights	8	40	3	0.96
	Ceiling Fan	4	75	3	0.9
Chemistry Corridor	Tube Lights	3	40	3	0.36
	LED Lights	2	20	3	0.12
	Ceiling Fan	2	75	3	0.45
Chemistry Headroom	LED Lights	2	20	3	0.12
	Ceiling Fans	2	75	3	0.45
Chemistry Lab - 3	Tube Light	16	40	3	1.92
	Ceiling Fan	1	75	2	0.15
Chemistry Physical Lab	Tube Lights	6	40	2	0.48
	Ceiling Fan	2	75	2	0.3
Chemistry Lab - 2	Tube Lights	5	40	2	0.4
	Stand Fan	2	75	2	0.3
Chemistry P.G. Head	Tube Lights	2	40	2	0.16
	Ceiling Fan	1	75	2	0.15
Chemistry Ladies Staffroom	LED Lights	2	20	3	0.12
	Ceiling Fans	2	75	3	0.45
Physics Lab - 1	Ceiling Fans	12	75	3	2.7

	Tube Lights	44	40	3	5.28
	LED Lights	3	20	3	0.18
	LCD projector	1	100	1	0.1
Physics Lab - 2	Ceiling Fan	8	75	5	3
	Tube Lights	23	40	5	4.6
Physics Computer Lab	Window A.C	2	1000	0.1	0.2
	Desktop Computer	20	150	2	6
	Stand Fan	1	75	2	0.15
	Fridge	1	167	1	0.157
Physical Education	LED Lights	2	20	3	0.12
	Ceiling Fan	5	75	3	1.125
	Tube Lights	4	40	3	0.48
Telugu Department	Ceiling Fan	3	75	3	0.675
	Tube Lights	2	40	3	0.24
History Department	Ceiling Fan	2	75	3	0.45
	Tube Lights	2	40	3	0.24
Political Science Dept	Ceiling Fan	3	75	3	0.675

	Tube Lights	4	40	3	0.48
Scholarship	Tube Lights	4	40	3	0.48
	Ceiling Fan	2	75	3	0.45
Economics Department	Ceiling Fan	2	75	3	0.45
	Tube Light	2	40	3	0.24
Total Electricity Consumption					159.204

The above calculated average consumption of electrical energy units per day were approximately coincided with average daily consumption units of electrical energy as per invoice issued by the power supply authorities.

6. CONCLUSION AND RECOMMENDATIONS

Energy audit was conducted on the Andhra Christian College, Guntur district campus during the period from 8-12-2022 to 16-12-2022 for a period of two days. In the energy audit conducted at Andhra Christian College, Guntur, Guntur district, following conclusions were reached.

- It is observed that there are many fluorescent and CFL tube lights in use which must be replaced with LED tube light to save a lot of energy
- It was found that fans consume the most electricity. Many old fans of over 20 years standing were identified. The continuous use of ceiling

fans for more than 5 hours also contributes significantly to the high cost of electricity. Old fans should also be checked and replaced for significant reduction in energy consumption. Instead of conventional fans, BLDC fans could be used for reduced consumption.

- Outdoor energy consumption can be significantly reduced by using solar lights in all areas of the college.
- Solar Power units installed in the campus must be fully used and if necessary new solar power units must be installed to make the campus eco-friendly.
- High energy consuming devices like A.Cs, computers, fridges, printers should be used efficiently as and when required.

Guntur,

Dt. 11-01-2023


ASSISTANT ENGINEER
OPERATION :: A.P.C.P.D.C.
03 SECTION :: GUNTUR