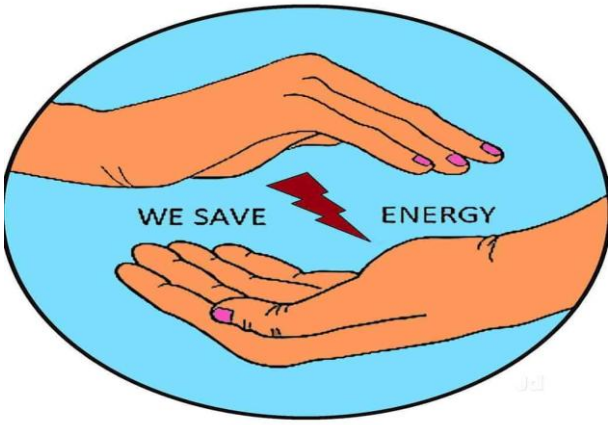
ADUSUMILLI GOPALAKRISHNAIAH & SUGARCANE GROWERS

SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

Vuyyuru-521 165, Krishna District, Andhra Pradesh

An Autonomous College in the Jurisdiction of Krishna University

Accredited by NAAC with "A" Grade ISO 9001:2015 Certified Institution



Energy Audit Report (2021-22)

Prepared by

By Department of Physics

MEMBERS OF ENERGY AUDIT COMMITTEE

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Preface

Data collection for Energy audit of the A.G & S.G Siddhartha Degree College of Arts and Science (AUTONOMOUS), Vuyyuru Campus was done by physics dept. for the period of 1 June 2021 to 1 May 2022.

This audit was over sighted to inquire about convenience to progress the energy competence of the campus. This audit required to recognize the mainly energy proficient appliances. Besides, several each day processes concerning common appliances have been provided which facilitate sinking the energy expenditure.

The energy audit survey was completed by Dept. Of Physics. All data collected from each classroom, laboratory, every room. The work is completed by considering how much tubes, fans, A.Cs, electronic instruments etc in each room. How much was participation of each component in total electricity consumption is calculated.

Acknowledgement

We are very much thankful to Principal K. Satyanarayanaand NAAC coordinatorDr.V.Subhashini, for motivating us and giving us the opportunity for energy audit. We tried our best to present this energy report as per requirements of college and our expertise work.

Energy Audit Report of A.G & S.G Siddhartha Degree College of Arts and Science (AUTONOMOUS), Vuyyuru-Introduction:

Energy is an important commodity in this modern era. As the utility of energy is continuously increasing due to reasons like population growth, increase in usage of electrical equipment, mechanization, enhancement in comfort living requirements etc., The Energy production is not increasing to meet such peak increase in usage of Energy. It is leading to huge gap between Energy Demand and Supply. Hence it is every citizens responsibility to reduce the gap between energy demand and supply by conserving energy as much as possible. In order to implement energy conservation it is necessary to understand the consumption patterns and possible avenues of conservation. Energy Audit is one best way to achieve this.

An energy audit is a way to calculate how much energy being used at college campus. It will help to identify how much energy uses and where could be saving energy possible.

Today we are marching towards the desirable status of a developed nation with fast strides. But the development should be a sustained one. For achieving such an interminable development energy management is essential.

As far as concerning electricity crisis, we are facing lack of electricity during office work.

So, institutional management is taking design regarding production of electricity and saving electricity for eco-social aspect.

Energy requirement of India is growing and incomplete domestic fossil fuel treasury.

The country has motivated strategy to enlarge its renewable energy resources and policy to establish the nuclear power plants. India increases the involvement of nuclear power to largely electrical energy development facility from 4.2% to 9%.

Energy conservation means reduction in energy consumption without making any sacrifice of 5 quantity or quality. A successful energy management program begins with energy conservation; it will lead to adequate rating of equipment's, using high efficiency equipment and change of habits which causes enormous wastages of energy. By observing all these study lack of electricity and huge electricity demands.

It is necessary to plan to be self-sufficient in electricity requirement. In the present study, college electricity audit has been done. In this study considered practical laboratory, instrument, Fans, air conditioners, Computers etc are considered in this study.

we have studied the exact contribution of bulb, fans, computer, instruments etc in the total requirement of electricity. We studied all these mentioned thinks by collecting exactly data form survey.

•General:

The A.G & S.G Siddhartha Degree College of Arts and Science (AUTONOMOUS), VuyyuruEntrusted the work of conducting a detailed Energy Audit of campus with the main objectives are as bellows:

OBJECTIVES:

1)To estimate Energy consumption in college campus.

2) To understand peak energy consumption pattern .

3)To identify ways and means of Energy Conservation

4)To propose action plan for Energy Conservation

•Scope of Work, Methodology and Approach:

Scope of work and methodology were as per the proposal .While undertaking data collection, field trials and their analysis, due care was always taken to avoid abnormal situations so as to generate normal/representative pattern of energy consumption at the facility.

•**Approach to Energy Audit**:

We focused our attention on energy management and optimization of energy efficiency of the systems, sub systems and equipments. The key to such performance evaluation lies in the sound knowledge of performance of equipments and system as a whole.

• **Energy Audit**:

The objective of Energy Audit is to balance the total energy inputs with its use and to identify the energy conservation opportunities in the stream. Energy Audit also gives focused attention to energy cost and cost involved in achieving higher performance with technical and financial analysis. The best alternative is selected on financial analysis basis.

Energy Audit Methodology: Energy Audit Study is divided into following steps

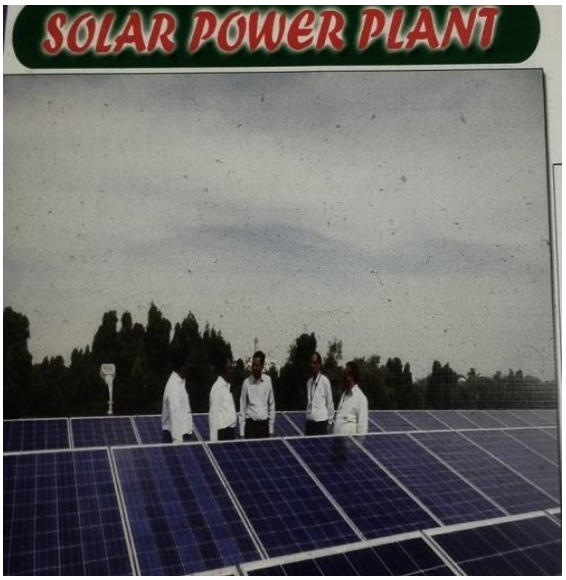
1. **Historical Data Analysis**: The historical data analysis involves establishment of energy consumption pattern to the established base line data on energy consumption and its variation with change in production volumes.

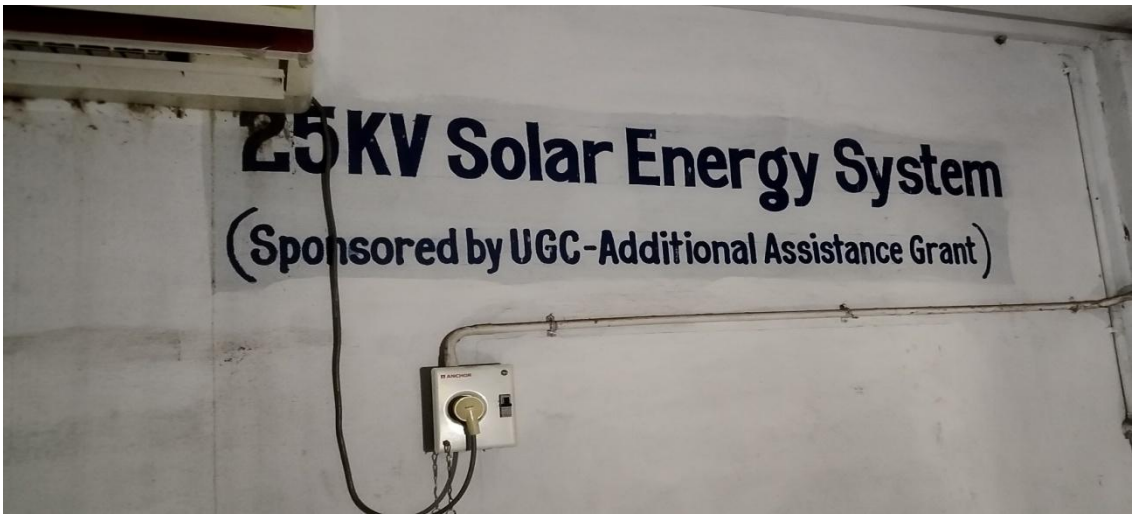
2. **Actual measurement and data analysis**: This step involves actual site measurement and field trials using various portable measurement instruments. It also involves input to output analysis to establish actual operating equipment efficiency and finding out losses in the system.

3. Identification and evaluation of Energy Conservation Opportunities: This step involves evaluation of energy conservation opportunities identified during the energy audit. It gives potential of energy saving and investment required to implement the proposed modifications with payback period.

Electricity Solar Grid connected solar plant (25 kW)

SOLAR PANELS





Pictures of Solar Power Plant

Following are the major consumers of electricity in the facility:

1) computers

2) Air-Conditioning Machines

3) Fans

4) Other Lab Equipment

5) Printers

6)Tube lights

7) Projectors

8)**Refrigerators**

9) water coolers

10) LCD TVS

11) Bore water motors

12) RO plant

13) Genesis Diesel generator

Genesis Diesel generator

Historical Data Analysis

Study of variation of Monthly Units consumption &Power Factor:

In this Chapter, We study the details of 12 month Electricity Bills.

Variation in units consumption & Power Factor (PF)

S.NO	MONTH	NO OF UNITS (KVAH)	POWER FACTOR
1	JUN-2021	3340	0.88
2	JULY-2021	3686	0.61
3	AUG-2021	2664	0.99
4	SEP-2021	3799	0.68
5	OCT-2021	3450	0.86
6	NOV-2021	4125	0.99
7	DEC-2021	1972	0.66
8	JAN-2022	1500	0.11
9	FEB-2022	2395	0.44
10	MAR-2022	4561	0.82
11	APR-2022	4717	0.10
12	MAY-2022	4133	0.23
Total units =	**37,342**		**Avg: 0.61**

Power factor is the measure of how effectively the incoming power is used in an electrical system.

A high power factor indicates that the power supplied to the electrical system is effectively used.

A system with low power factor doesn't effectively consume the incoming electric supply and results in losses.

There is no power factor involved in DC circuits due to zero frequency.

But, in AC circuits, the value of power factor always lies between 0 and 1.

Conclusion: Variation of PF

The Power Factor to reduce the utility power bill. Most utility bills are influenced by KVAR usage. A good Power Factor provides a better voltage. Reducing the pressure on electrical distribution network. Reducing cable

heating, cable over loading and cable losses. Reducing over loadings of control gears and switch-gears etc…..

Whenever the average power factor over a billing cycle or a month, whichever is lower, of a High Tension consumer is below 90%, Penal charges shall be levied to the consumer at the rate of 2 % (two %) of the amount of monthly energy bill (excluding of Demand Charges, FOCA, Electricity Duty and Regulatory Liability Charge etc.)

For power factor of 0.99, the effective incentive will amount to 5% (five percent) reduction in the energy bill and for unity power factor; the effective incentive will amount to 7% (seven percent) reduction in the energy bill.

STUDY OF MONTH WISE ELECTRICITY BILL VARIATION

VARIATION IN ELECTRICITY BILL		
SNO	**MONTH**	**ELECTRICITY BILL AMOUNT IN RS/-**
1	**JUN-2021**	**25525**
2	**JULY-2021**	**6062**
3	**AUG-2021**	**16687**
4	**SEP-2021**	**30752**
5	**OCT-2021**	**47164**
6	**NOV-2021**	**43159**
7	**DEC-2021**	**30303**
8	**JAN-2022**	**23837**
9	**FEB-2022**	**17990**
10	**MAR-2022**	**24483**
11	**APR-2022**	**50209**
12	**MAY-2022**	**54241**
	TOTAL ANNUAL BILL = RS.370412	
	AVERAGE MONTHLY BILL = RS.30867	

Conclusion: Monthly Electricity bill variation has been identified

Roof Top PV Solar System (25kw) installed on terrace of building

STUDY OF MONTH WISE MAXIMUM DEMAND VARIATION

SNO	MONTH	MAXIMUM DEMAND (KVA/MONTH)
1	JUN-2021	45
2	JULY-2021	33
3	AUG-2021	41
4	SEP-2021	46
5	OCT-2021	55
6	NOV-2021	44
7	DEC-2021	54
8	JAN-2022	47
9	FEB-2022	60
10	MAR-2022	66
11	APR-2022	86
12	MAY-2022	47

Our college contains solar system of 25Kw power connected to grid by A.P.S.P.D.C.L

Avg. Estimated production of units from solar system per day is 100 units

Avg .consumption of units per day from grid , before installation of solar energy system is 140-160 units

Avg.consumption of units per day after installation is 50-60 units

Department wise Load consumption

Principal Room

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	LED Lights	20	10	200	8	1600
2	Fans	80	3	240	7	1680
3	AC's	2000	1	2000	7	14000
4	Refrigerator	500	1	500	7	3500
5	computer	60	1	60	6	360
6	Lcd tv	40	1	40	6	240

UG OFFICE

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	19	760	8	6080
2	Fans	80	9	720	7	5040
3	AC's	2000	1	2000	6	12000
4	Refrigerator	500	2	1000	7	7000
5	Xerox machine	300	1	300	1	300
6	computer	60	5	300	6	1800
7	PRINTERS	300	4	1200	1	1200

Examination cell

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	computers	60	4	240	6	1440
2	Fans	80	19	1520	7	10640
3	LED lights	15	21	315	5	1575
4	Printer	300	4	1200	1	1200
5	AC	2000	1	2000	5	10000
6	Refrigerator	*500*	1	500	7	3500

IQAC ROOM

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	5	200	7	1400
2	Fans	80	4	320	7	2240
3	computers	60	3	180	6	1080
4	printer	300	3	900	1	900
5	AC's	2000	1	2000	5	10000
6	Colour printer	350	1	350	1	350

NCC ROOM

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	LED Lights	40	3	120	7	840
2	Fans	80	2	160	7	1120
3	computers	60	1	60	6	360
4	printer	300	1	300	1	300

Department of Physics

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	computer	60	1	60	4	240
2	Fans	80	20	1600	5	8000
3	LED lights	15	22	330	5	1650
4	Printer	300	1	300	1	300
5	Refrigerator	500	1	500	5	2500
6	projector	250	1	250	1	250

Department of Maths

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	LED Lights	40	2	80	7	560
2	Fans	80	2	160	7	1120
3	computer	60	1	60	5	300
4	printer	300	1	300	1	300

Department of Chemistry

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	LEDTube Lights	40	40	1600	7	11200
2	Fans	80	10	800	6	4800
3	Exhaust fans	50	11	550	5	2750
5	computer	60	2	120	5	600
6	printer	300	1	300	1	300
7	Refrigerator	500	1	500	7	3500

Department of English

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	4	160	7	1120
2	Fans	80	5	400	7	2800
3	LED lights	40	13	520	7	3640
4	computers	60	24	1440	4	5760
5	printer	300	2	600	1	600
6	AC's	2000	2	4000	5	20000
7	projector	250	1	250	1	250
8	Lcd board	40	1	40	1	40

Department of Commerce

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	LED Tube Lights	40	3	120	7	840
2	Fans	80	3	240	7	1680
3	computers	60	1	60	5	300
4	printer	300	1	300	1	300

A.P.S.S.D.C COMPUTER LAB

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	LED Lights	40	16	640	7	4480
2	Fans	80	12	960	7	6720
3	AC's	2000	2	4000	4	16000
4	computers	60	30	1800	5	9000
5	laptap	50	30	1500	4	6000
6	printer	300	1	300	1	300
7	projector	250	1	250	1	250
8	Digital board	40	1	40	1	40

SEMINAR HALL

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	LED Lights	40	20	800	5	4000
2	Fans	80	13	1040	4	4160
3	AC's	2000	4	8000	1	8000
4	Mike system amplifiers	200	1	200	2	400

CANTEEN

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	8	320	7	2240
2	Fans	80	8	640	6	3840
3	Water cooler	500	1	500	7	3500
4	Grinder	750	1	750	3	2250

Department of Computers

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	LED Lights	40	25	1000	7	7000
2	Fans	80	24	1920	7	13440
3	AC's	2000	6	12000	5	60000
4	computers	60	80	4800	5	24000
5	printers	300	4	1200	1	1200
6	projector	250	1	250	1	250
7	Digital board	40	1	40	1	40

Department of History and Political science and Economics

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	LEDLights	40	4	160	6	960
2	Fans	80	3	240	6	1440
3	Tube lights	40	1	40	4	160
4	computers	60	2	120	4	480
5	printers	300	2	600	1	600

Department of Zoology

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	4	160	6	960
2	Fans	80	8	640	6	3840
3	LEDS	40	4	160	6	960
4	computers	60	1	60	3	180
5	printers	300	1	300	1	300
6	projector	250	1	250	1	250
7	Refrigirator	500	1	500	5	2500

Department of Botany

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	LEDLights	40	8	320	6	1920
2	Fans	80	10	800	7	5600
3	computers	60	2	120	5	620
4	printers	300	1	300	2	600
5	projector	250	1	250	1	250
6	Refrigirator	500	1	500	5	2500

Department of Telugu

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	2	80	6	480
2	Fans	80	2	160	7	1120
3	computers	60	1	60	4	240
4	printers	300	1	300	1	300

PG CHEMISTRY

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	20	800	4	3200
2	LED lights	40	17	680	7	4760
3	Fans	80	3	240	6	1440
4	exhaust fans	50	8	400	4	1600
5	computers	60	2	120	4	480
6	printers	300	2	600	1	600
7	Digital board	40	1	40	1	40

Library &NRC Room

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	24	960	6	5760
2	Fans	80	21	1680	6	10080
3	computers	60	10	600	4	2400
4	LED lights	40	2	80	6	480
5	printers	300	2	600	1	600
6	Xerox machine	110	1	110	1	110

Class rooms (NS 1 - NS 6)

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	12	480	8	3840
2	Fans	80	24	1920	6	11520

WOMEN'S HOSTEL (ROOM 1- ROOM 4)

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	8	320	6	1920
2	Fans	80	4	320	7	2240

CLASS ROOMS (M 9 – M15)

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	15	600	6	3600
2	Fans	80	23	1840	6	11040

CLASS ROOMS (WB 2 – WB10)

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	25	1000	6	6000
2	Fans	80	22	1840	6	11040

CLASS ROOMS (RL1 – RL5)

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	24	960	6	5760
2	Fans	80	30	2400	6	1440
3	PROJECTORS	250	2	500	2	1000
4	DIGITAL BOARD	40	2	80	2	160

INDOOR STADIUM

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	16	640	6	3840
2	Fans	80	13	1040	6	6240

OUTDOOR STADIUM

Sno	Name of the appliance	Power rating (Watt)	Quantity	Power Consumption (Watt)	Usage Per Day	Power Consumption / Day (Watt)
1	Tube Lights	40	6	240	6	1440
2	Fans	80	4	320	6	1920

Experimental and data collection:

All required data is collected by Department of Physics. In building, in every room, how much fans, tubes, fans, computer, instrument AC, etc will these is measured. According to survey following data is collected.

Lighting System

Observations and suggestions:

- **It is found that FTL, Bulbs, CFLs is installed in the facility.**
- **It is recommended that some tube lights in this area be switched off when sufficient daylight is available.**
- **Every light or electric gadget left on when not needed is wasting energy and money and is causing pollution that is totally unnecessary.**
- **Stand-by power can use up to 8% of a household's total electricity.**

- **Don't forget to power down these things when not in use:**

- **Lights**
- **fans and AC's**
- **Printers and scanners**
- **Battery and phone chargers**
- **Computers**

Energy Conservation Proposals

Replacing Fluorescent Tube Lights (FTL) with LED Tube Lights

The 500 FTLs can be replaced with the LED tube lights 15 W. These changes can be made at the places where the life is higher. Usually minimum of 3 years warranty is given and approximate burning hours is 40, 000

. **Following calculations are done for 8 hours working:**

Power consumption by 36 W FTL with conventional cho = 40 W/ Tube Light

- Equivalent LED tube light = 15 W/ Tube Light
- Savings in power = 24 W/ Tube Light
- Operating hours = 8 h/day x 300 = 2400 h/year
- Tube Light Yearly savings = 2400 x 24 W = 57.6 kWh/year/Tube Light
- Average Cost of electricity = Rs.7.66/ kWh
- Saving = 57.6 kWh x 7.66 = Rs.441.216 / year/ Tube light
- Approximate investment on single LED Tube lights = Rs. 200
- Number of Tube Lights to be replaced = 10

General Recommendations

- All Class Rooms and labs to have Display Messages regarding optimum use of electrical appliances inthe room like, lights, fans, computers and projectors. Save electricity. Display the stickers of save electricity, save nature everywhere in the campus. So that all stakeholders encouraged to save the electricity.

- Most of the time, all the tube lights in a class room are kept ON, even though, there is sufficient light level near the window opening. In such cases, the light row near the window may be kept OFF .

- All projectors to be kept OFF or in idle mode if there will be no presentation slides.

- All computers to have power saving settings to turn off monitors and hard discs, say after10minutes/30 minutes.

- The comfort/Default air conditioning temperature to be set between 24˚C to26˚C.

- Lights in toilet area may be kept OFF during daytime

- Need to focus on existing solar plant which is generating power below the rated power

- Need to replace FTL by smart LED Tube

- Need to replace ordinary bulb by LED bulb.

- Need to replace ordinary CRT monitor by LED.

- Need to replace ordinary refrigerator by BEE power saver refrigerator if possible.

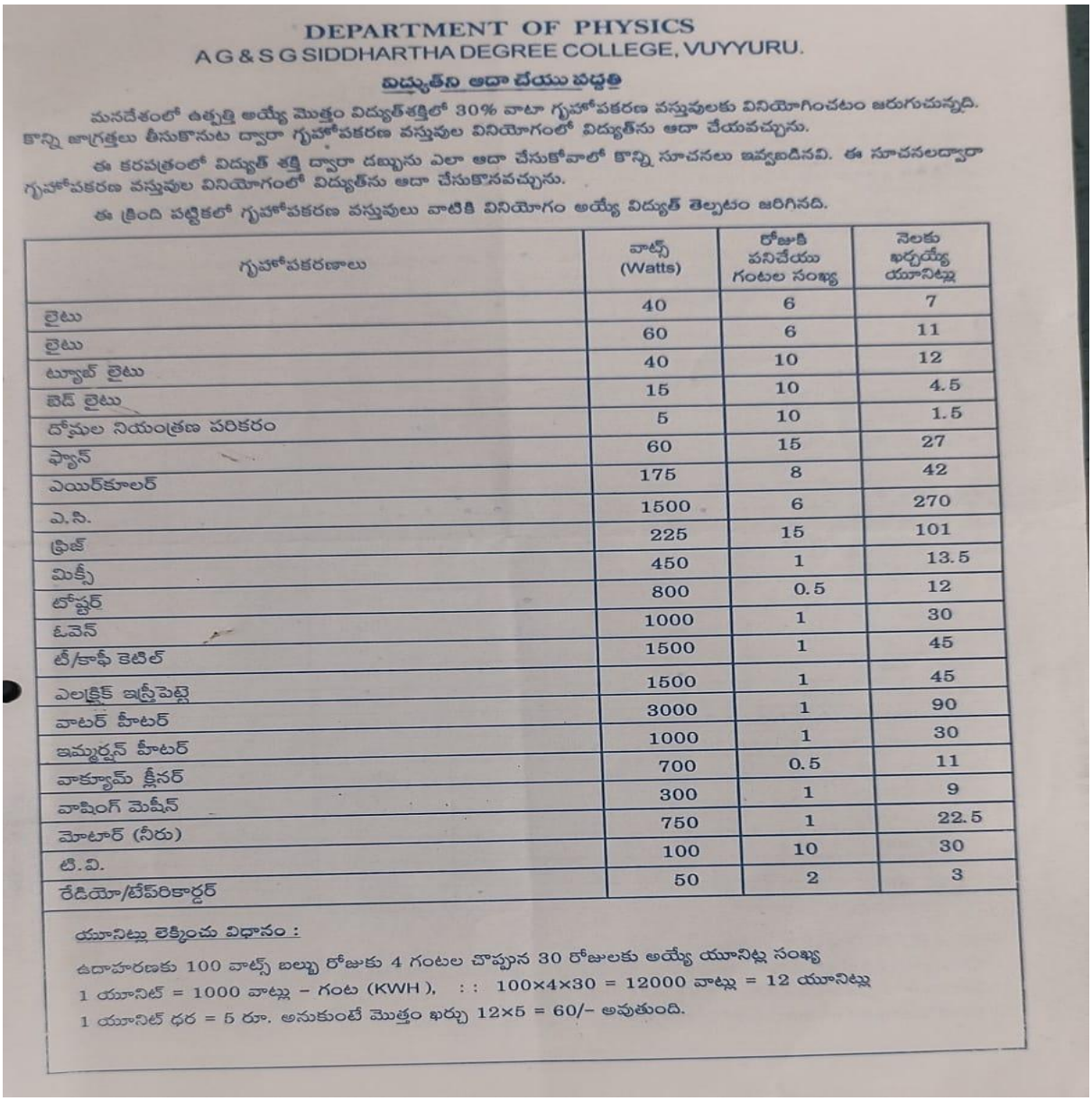
Executive Recommendations:

1) Replace all CFL Tube light using LED Bulb, to save more power.

2) Replace CRT monitor using LED or LCD monitor.

3) Separate connection of office, Computer Lab and classroom.

TIPS ON ENERGY SAVING IN TABLE FORMAT GIVEN TO STUDENTS OF OUR COLLEGEFOR BETTER UNDERSTANDING



DEPARTMENT OF PHYSICS
AG & SG SIDDHARTHA DEGREE COLLEGE, VUYYURU.

విద్యుత్‌ను ఆదా చేయు పద్ధతి

మనదేశంలో ఉత్పత్తి అయ్యే మొత్తం విద్యుత్‌శక్తిలో 30% వాటా గృహోపకరణ వస్తువులకు వినియోగించటం జరుగుచున్నది. కొన్ని జాగ్రత్తలు తీసుకొనుట ద్వారా గృహోపకరణ వస్తువుల వినియోగంలో విద్యుత్‌ను ఆదా చేయవచ్చును.

ఈ కరపత్రంలో విద్యుత్ శక్తి ద్వారా డబ్బును ఎలా ఆదా చేసుకోవాలో కొన్ని సూచనలు ఇవ్వబడినవి. ఈ సూచనలద్వారా గృహోపకరణ వస్తువుల వినియోగంలో విద్యుత్‌ను ఆదా చేసుకొనవచ్చును.

ఈ క్రింది పట్టికలో గృహోపకరణ వస్తువులు వాటికి వినియోగం అయ్యే విద్యుత్ తెల్పటం జరిగినది.

గృహోపకరణాలు	వాట్స్ (Watts)	రోజుకి పనిచేయు గంటల సంఖ్య	నెలకు ఖర్చయ్యే యూనిట్లు
లైటు	40	6	7
లైటు	60	6	11
ట్యూబ్ లైటు	40	10	12
బెడ్ లైటు	15	10	4.5
దోమల నియంత్రణ పరికరం	5	10	1.5
ఫ్యాన్	60	15	27
ఎయిర్‌కూలర్	175	8	42
ఎ.సి.	1500	6	270
ఫ్రిజ్	225	15	101
మిక్సీ	450	1	13.5
టోస్టర్	800	0.5	12
ఓవెన్	1000	1	30
టీ/కాఫీ కెటిల్	1500	1	45
ఎలక్ట్రిక్ ఐస్త్రీపెట్టె	1500	1	45
వాటర్ హీటర్	3000	1	90
ఇమ్మర్షన్ హీటర్	1000	1	30
వాక్యూమ్ క్లీనర్	700	0.5	11
వాషింగ్ మెషీన్	300	1	9
మోటార్ (నీరు)	750	1	22.5
టి.వి.	100	10	30
రేడియో/టేప్‌రికార్డర్	50	2	3

యూనిట్లు లెక్కించు విధానం :

ఉదాహరణకు 100 వాట్స్ బల్బు రోజుకు 4 గంటల చొప్పున 30 రోజులకు అయ్యే యూనిట్ల సంఖ్య
1 యూనిట్ = 1000 వాట్లు – గంట (KWH), :: 100×4×30 = 12000 వాట్లు = 12 యూనిట్లు
1 యూనిట్ ధర = 5 రూ. అనుకుంటే మొత్తం ఖర్చు 12×5 = 60/– అవుతుంది.

DEPARTMENT OF PHYSICS

A G & S G SIDDHARTHA DEGREE COLLEGE, VUYYURU.

TIPS ON ENERGY SAVING

The Domestic Sector accounts for 30% of total energy consumption in the country. There is a tremendous scope to conserve energy by adopting simple measures.

This information is a guide, which offers easy, practical solutions for saving energy in Home Appliances. Please, take a few moments to read the valuable tips that will save energy & money and ultimately help conserve our natural resources.

It would be useful to know which gadget consumes how much electricity. Economic use of home appliances can help in reducing electricity bills.

The following table shows the energy consumption of various appliances normally used at home :

Home Appliances	Rating (Watts)	Operating Hrs. / Day	Units/ Month
Incandescent Bulbs	40	6	7
Incandescent Bulbs	60	6	11
Fluorescent Tube light,	40	10	12
Night Lamp	15	10	4.5
Mosquito Repellent	5	10	1.5
Fans	60	15	27
Air Coolers	175	8	42
Air Conditioners	1500	6	270
Refrigerator	225	15	101
Mixer/Blender	450	1	13.5
Toaster	800	0.5	12
Hot Plate	1500	0.5	22.5
Oven	1000	1	30
Electric Kettle	1500	1	45
Electric Iron	1500	1	45
Water Heater-Instant Type (1-2 Ltr.capacity)	3000	1	90
Water Heater-Storage Type (10-20 Ltr.capacity)	2000	1	60
Immersion rod	1000	1	30
Vaccum Cleaner	700	0.5	11
Washing Machine	300	1	9
Water Pump	750	1	22.5
T. V.	100	10	30
Audio system	50	2	3

Method of Calculation of Units :

If 100 Watts bulb works 4 hrs. per day, the no.of Units Consumed in 30 days are

100x4x30 = 12000 watts = 12 Units. (1 unit = 1000 watts/hr)

If 1 Unit Cost is Rs.5/- then Total Cost = 12x5 = 60/-

ELECTRICAL ENERGY - SAVING TIPS

LIGHTING SYSTEM

1. One of the best energy-saving devices in lighting is the switch. Turn off lights when not required.
2. Efficient Fluorescent tube lights such as T5, CFLs and LEDs are much more efficient than incandescent bulbs and can save about 60-80% of electricity for the same lighting levels.
3. Electronic ballasts can reduce power consumption by 20%.
4. Consider employing infrared sensors, motion sensors, automatic timers, dimmers and photocells switches wherever applicable for efficient use. Use outdoor lights with timers or photocells so that they turn off automatically in day light and avoid using curtains during the day.
5. Use task lighting, which focuses light where it is needed. A reading lamp, for example, lights only reading material rather than the whole room.
6. Dirty tube lights and bulbs deliver less light and can absorb about 50 percent of the light; dust tube lights and lamps regularly.
7. Look for BEE rating on the Tubular Fluorescent Lamps.
8. Use artificial lighting only when there is inadequate natural light in a space.
9. Don’t replace tube lights (line source) which light over a larger linear spread with a bulb (point source) that emits light from a single point.
10. Don’t use dark-colored surface in workrooms. These reduce the reflected light levels and increase the number of lamps required to illuminate the space.
11. Children are advised to study in one room and with individual table lamps and advise them to switch off the individual lamps when not required. Children to utilize morning hours & broad day light for studies rather than using artificial light.
12. Switch off alternate tube Lights/lamps in common areas and staircases during late hours in the night.
13. Please note, a ‘Zero Watt’ incandescent bulb uses about 10 to 15 watt while an LED bulb of 9 watt can provide light output equivalent to 60 watt incandescent bulb.

CEILING FAN

1. Replace conventional regulators with electronic regulators for ceiling fans.

2. Height of the fan relative to the ceiling. If fan is too close to the ceiling, the airflow is restricted; that is, the fan will not be able to draw as much air through its blade as it has the potential to do. For this reason, 'Hugger' style fans (those which mounted directly to the ceiling without the use of down rod) are all inherently disadvantaged. The distance that a fan should be mounted form the ceiling is directly correlated with its air moving potential; no fan should be mounted with its blade closer than 24 inches to the ceiling.

3. Pitch of the fan's blades. The angle at which the fan's blades tilted relative to X axis is referred to as the blade pitch. The steeper the pitch, the greater the air flow.

   Since increased pitch also means increased drag, only fans with well-made motors can support steep pitches. Cheaply made fans typically have a pitch between 9 and 13 degrees.

AIR CONDITIONER

1. Use BEE star labeled products.

2. Use ceiling or table fan as first line of defense against summer heat. Ceiling fans, for instance, cost about 3 rupees an hour to operate – much less than air conditions (Rs.100 per hour).

3. One will use 3 to 5 per cent less energy for each degree air conditioner is set above 22°C (71.5°F), so far set the thermostat of room air conditioner at 25°C (77°F) to provide the most comfort at the least cost.

4. Reduce air-conditioning energy use by as much as 40 per cent by shading your home as windows and walls. Plant trees and shrubs, to keep the day's hottest sun off your house.

5. Using ceiling or room fans allows you to set the thermostat higher because the air movement will cool the room.

6. A good air conditioner will cool and dehumidify a room in about 30 minutes, so use a timer and leave the unit off for some time.

7. Clean the air-conditioner filter every month. A dirty air filter reduces airflow and may damage the unit. Clean filters enable the unit to cool down quickly and use less energy.

8. Have your air conditioning unit checked every 6 months. If the Freon level is not correct, you will waste a lot of energy and your home will never be as cool as you want it.

9. The gaps around the windows and doors leads to A C loss. You can use a candle to look for drafts. It the flame flickers or dances, found the place to seal.

10. Draperies on windows help reduce energy loss.

11. Use electronic devices with occupancy sensors which switch on or off automatically by sensing if the room is occupied.

12. Switch to evaporative coolers from air conditioners during hot/dry summer months.

13. Buy split ACs instead of window ACs. They cost more, but they are more energy efficient and consume lesser electricity.

14. Do not install AC units on the west and south walls as these are exposed to direct sunlight through a major part of the day during summers.

15. Do not apply dark colors on the external surfaces (roof and walls) of the house. Dark colors absorb more heat than light colors, leading to increased use of the AC.

16. Ensure that the condenser of the unit must have enough space around it for air to circulate and help the refrigerant dissipate its heat easily.

COMPUTER

1. Computer that runs 24 hours a day, for instance, used-more power than an energy efficient refrigerator.

2. Screen savers save computer screens, not energy. Start-ups and shutdown do not use any extra energy, nor are they hard on your computer components. In fact, shutting computers down when you are finished using them actually reduces system wear and saves energy.

3. Purchase flat-screen LCD monitors.

4. Setting computers, monitors and copiers to sleep-mode when not in use helps cut energy costs by approximately 40%

5. Activate and standardize ‘power down’ on new and existing PCs

6. If your computer must be left on, turn off the monitor; this device alone uses more than half the system’s energy.

ENERGY AUDIT TEAM REPORT

WORK COMPLETION REPORT

Name of Work Project : Energy Audit of A.G & S.G Siddhartha Degree College of Arts and Science (AUTONOMOUS), Vuyyuru

Work Period : 1 June 2021 to 1 May 2022

This is to certify that the Energy audit team appointed by the Principal, A.G & S.G Siddhartha Degree College of Arts and Science (AUTONOMOUS), Vuyyuru has successfully completed Energy audit. The work of energy audit is completed for year 2021-22.

Audit Report by :

Internal Committee

1. **J.Hareesh chandra**
   Head of the Department of Physics
2. **M.Sateesh**
   Lecturer in Dept.of physics
3. **M.P.D.Parimala**
   Lecturer in Dept.of physics

1. J. Hareesh chandra
HEAD OF THE DEPT. OF PHYS...
AG. & SGS. DEGREE COLL...
VUYYURU-521 165.

2. M. Sateesh

3. M. P. D. parimala

External Committee

1. **Sri. J.V.L. Satyanarayana**
   District Manager,
   NREDCAP
   VIJAYAWADA.

PRINCIPAL
AG & SG Siddhartha Degree College of Arts&Science (Autonomous),Vuyyuru

DISTRICT MANAGER
N.R.E.D.C.A.P.
KRISHNA & N.T.R.DISTRICTS

ఆంధ్రప్రదేశ్ నూతన మరియు పునరుద్ధరణీయ ఇంధన వనరుల అభివృద్ధి సంస్థ లి.

New & Renewable Energy Development Corporation of AP Ltd.,

(A State Government Company)

PLOT NO:-160,RTC COLONY 4TH ROAD,PANTAKALUVA ROAD,PATAMATA,VIJAYAWADA,KRISHNA-520008.

Ph:0866-2472586. Email: krishnanedcap@gmail.com

Date: 26/07/2023.

Declaration

This is to certify that I, J. V. L. Satyanarayana, District Manager, NREDCAP, Vijayawada was requested by the Principal, A.G. & S.G. Siddhartha Degree College of Arts and Science, Vuyyuru for conducting Energy Audit of the campus for the period from 01-06-2021 to 01-05-2022 during the Academic year 2021-22.

I visited the college on 26-07-2022 and focused upon the following aspects:

- Study of variation of Monthly Units consumption & Power Factor.
- Study of month wise electricity bill variation.
- Study of month wise maximum demand variation.
- Department wise load consumption.
- Solar Energy & wheeling to grid.
- Usage of Diesel Generator.

Based on the above aspects, the efforts taken by the college towards energy conservation and use of solar energy is highly appreciated. Further it is suggested to follow some more energy conservation protocols and energy saving tips in the campus so as to assure complete energy conservation and make the campus eco-friendly.

Yours faithfully,

District Manager
N.R.E.D.C.A.P.

DISTRICT MANAGER
N.R.E.D.C.A.P.
KRISHNA & N.T.R.DISTRICTS