

**ADUSUMILLI GOPALAKRISHNAIAH AND SUGARCANE GROWERS  
SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE**

(Autonomous)

VUYYURU-521165, KRISHNA Dt., A.P.

Accredited by NAAC with "A" Grade



**DEPARTMENT OF BOTANY**

**GREEN AUDIT**



Principal

Adusumilli Gopalakrishnaiah & Sugarcane Growers  
Siddhartha Degree College of Arts & Science,  
Vuyyuru-521165, Krishna District

## CONTEXT

The term 'Environmental audit' or 'Green audit' means systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. Green Audit focuses on energy conservation, use of renewable sources, rain water harvesting, efforts of carbon neutrality, planting of trees, hazardous waste management and E-waste management. Finally, Green audit is a requirement of NACC assessment to the Colleges and Universities.

It aims to analyze environmental practices within and outside the institution, which will have an impact on the eco-friendly ambience. Green audit makes an institution to review the measures taken by it to combat pollution. The green audit practically involves energy conservation, use of renewable sources, rain water harvesting, and efforts of carbon neutrality, planting of trees, hazardous waste management and E-waste management. Finally, Green audit is a requirement of NACC assessment to the Colleges and Universities.

There are many advantages of green audit. Green Audit could help to shield the environment. It recognizes the cost saving methods through waste minimizing and managing strategies. It points out prevailing and forthcoming complications. It validates conformity with the implemented laws Empower the organizations to frame a better environmental performance. It portrays a good image of a institution which helps building better relationships with the group of stakeholders. It enhance the alertness for environmental guidelines and duties

## INTERNAL AUDIT TEAM

1.K. Satyanarayana	Principal
2.Dr. V. Sri ram	Coordinator, IQAC
3.Ch.Beulah Ranjani	HOD, Dept. of Botany
4.D.A. Kiranmayee	HOD, Dept. of Zoology
5.U.Ramprasad	HOD, Dept. of Physics
6. K. Ramesh	HOD, Dept. of Chemistry
7.T.Nagaprasad	HOD, Dept. of Computer Science

## EXTERNAL AUDIT TEAM

1.Dr. Ratna kumari	Prof. & Univ. Head Department of Crop Physiology, Agricultural college, Bapatla
2.Jannu Rajesh	Assistant Engineer, Municipal corporation, Vuyyuru
3.Dr.Ch. Srinivasa Reddy	HOD, Dept. of Botany, SRR& CVRD Govt. Degree College, Vijayawada

## CHAPTER-I: INTRODUCTION

### 1.1 About College

Adusumilli Gopalakrishnaiah and Sugarcane Growers College, Vuyyuru established on 12th August 1975 is managed by Siddhartha Academy of General and Technical Education. It is proud to proclaim, that we are imparting student-centric and skill-based education coupled with competitive skills, soft skills, ethics and environmental education. It is known for its Domicile of Excellence, a campus of inspiration. Reaccredited at Grade „A” by the NAAC, Bengaluru in 2017, the college is committed for imparting best education in diversified disciplines.

It is evidenced that the college continuously thrives to be environment friendly by effective utilization of the available resources without depleting them. Regular annual investments made on developing greenery establish the commitment of Management for Environment. Further, the College is in forefront in organizing various activities related to environment such as Swatch Bharat Abhiyan, Janmabhumi, Maa Vooru, Vanamohotsav, Clean and Green awareness camps, energy conservation programs, utilization of solar energy and waste management by vermi composting etc.

### LOCATION MAP OF COLLEGE



COLLEGE MAP



Principal  
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Vuyyuru-521 165, Krishna District.



## 1.2 AIM AND OBJECTIVES OF GREEN AUDIT

The main objective of this Environmental and Green Audit is to get an opinion on the quality of various natural elements and to identify any conservation opportunities and implement possible best practices.

Government of India in 2006 has declared the National Environment Policy 2006 and made green audit mandatory to each industry. According to this policy it is a response to India's National commitment to a clean environment, mandated in the Constitution in Articles 48 A and 51 A (g), (DPSP) strengthened by judicial interpretation of Article 21 (National Environmental Policy 2006). It is recognized that the maintenance of the healthy environment is not the responsibility of the state alone. It is the responsibility of every citizen and thus a spirit of partnership is to be realized through the environment management of the country. By realizing the need of responsibility towards environment, NAAC, an autonomous body under UGC has added the concept of environmental audit in accreditation methodologies of universities and colleges.

Clean and Green environment make a person feel comfort, pleasant and peaceful, therefore teaching and learning will be effective and provides a stress less learning environment. Green auditing is one among the various efforts around the world to address environmental education issues. The main objective of the green audit is to promote the environment, management and conservation in the college campus.

### Main objectives of Green Audit

- To recognize, diagnose and resolve the environmental problems and secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus
- To minimize the consumption of water and energy consumption and provide baseline information to enable organization to evaluate and manage environmental change, threat and risk.
- To train all stakeholders of the organization and empower them to contribute and participate in the environmental protection and facilitate them with different aspects of disaster management
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requires high cost
- To identify the risks of hazards and implement the policies for safety of stakeholders and to set up procedure for disposal of all types of harmful wastes
- To bring out a status report on environmental compliance

## 1.3 ADVANTAGES OF GREEN AUDITING

- To maintain greenery in campus
- To facilitate waste management through reduction of waste generation, solid- waste and water recycling
- To bring awareness in health consciousness among the stakeholders.
- To be a plastic free campus
- To instruct environmental education through systematic environmental management approach.

## CHAPTER-II: PRE-AUDIT

### 2.1 Introduction on green auditing

A Nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. Educational institutions now a days are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly. To preserve the environment within the campus, various view points are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc. The activities pursued by colleges can also create a variety of adverse environmental impacts.

Environmental auditing is a process whereby an organization's environmental performance is tested against its environmental policies and objectives. Green audit can be a useful tool for a college to determine how and where they are using the most of the energy or water resources. The college can then consider how to implement changes and make savings or to improve waste minimization plan. Green auditing can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Green auditing promote financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. Thus it is imperative that the college evaluate its own contributions toward a sustainable future.

### 2.2 Pre-auditing report

A pre-audit meeting was held on 18<sup>th</sup> September 2021 in our college campus. The meeting provided an opportunity to reinforce the scope and objectives of the audit and discussions were held on the practicalities associated with the audit. The committee is decided to audit different areas like water management, energy management, waste management etc. in our college campus. The committee resolved to conduct auditing during 20<sup>th</sup> -31<sup>st</sup> September 2021 with the help teaching, non-teaching, NSS and NCC students. Our Management has shown great interest and dedication towards green auditing during the pre-audit meeting. They encouraged all green activities such as awareness programmes on waste management, clean and green campus, minimization of e-waste and planting more trees on the campus etc. The management of the college will formulate policies based on the green auditing report.

### 2.3 Areas of green auditing

The study area includes degree college campus, botanical garden, intermediate block garden, college canteen, lawn, ground, PG block garden etc. The study area is very much eco-friendly of the Vuyyuru Rural area and rich in trees and biodiversity. The Department of Botany is maintaining a Botanical garden with medicinal plants, floriculture plants and fruit plants along with organic farming associated with Zoology department. Plants are grown here for academics, knowledge and to lessen pollution in the campus.



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## 2.4 Methodology

Green auditing was conducted during 20<sup>th</sup> -30<sup>th</sup> September 2021 by our committee. The green audit began with physical verification on different facilities at the college, determining the different types of appliances and utilities like lights, taps, toilets, fridges, air conditioners etc. as well as measuring the usage per item (Watts indicated on the appliance or measuring water from a tap) and identifying the relevant consumption patterns (such as how often an appliance is used) and the impact that they have.

For our study convenience the entire college was divided into 9 blocks, viz., Entrance, Indoor stadium, Inter block garden, Canteen, UG& PG Labs, Basket ball court, Administrative office, Outdoor stadium surrounding the walking track and parking area. Different audit groups interviewed office staff, Principal, Teaching and non-teaching staff, students, parents and other stakeholders of the college. Discussions were also made with the PTA office bearers to clarify doubts regarding certain points. Verified college documents such as admission registers, registers of electricity and water charge remittance, furniture register, laboratory equipment registers, purchase register, audited statements and office registers. Collected college calendars, college magazines, annual report of the college and NAAC self-assessment reports, UGC report etc. The college and its premises were visited and analyzed by the audit-teams to gather information. Campus trees were counted and identified. Finally discussions were made with the college management regarding their policies on environmental management. Future plans of the college were also discussed.

## CHAPTER-III: ONSITE AUDIT OBSERVATIONS AND RECOMMENDATIONS

### 3.1 Auditing of Water Management

Water plays a vital role for living beings. Our students and staff follow the best practice "SAVE WATER-SAVE LIFE". Water, it is not only life; it is the backbone of economy of every country. Auditing of water management is an onsite survey which includes water sources, water consumption, irrigation, rain water, appliances and fixtures, and assessment to determine the water use and hence improving the efficiency of its use.

## Observations

- The team observed that bore well and municipal water are the two major sources of water.
- The data collected from all the departments is examined and verified and on an average the total use of water in the college is 16000 L/day, which include 4000 L/day for drinking purposes, 3000 L/day for canteen, 2000L/day for toilets, 4000L/day for gardening and 3000L/day for laboratories.
- The students and staff use sufficient quantity of water and turn of taps immediately.
- College campus has 9 drinking water points, 15 water points for hand wash and cleaning lunch boxes
- Utmost care is taken for flow of water through pipes without any leakage
- To make judicious use of water available, the college has installed several water sprinklers in garden areas.
- During the survey, no loss of water is observed, neither by any leakages, or by over flow of water from overhead tanks.

## Recommendations

- Set up an efficient water recycling system in the college canteen
- Increase the number of water taps and set up spray pattern or hand shower taps for reducing the consumption of water.





### 3.2 Rain water harvesting:

The rain water coming from roof tops and that flowing within the campus are collected in 6 percolation pits constructed in the campus to recharge ground water. The water is used for gardening.

#### Recommendations:

- It is suggested to install two more rain water harvesting system
- It is also suggested to construct a check dam through pumping of water.
- It is also suggested to utilise the rain water for laboratory purpose.



### 3.3 Auditing of Energy

Auditing of Energy includes energy sources, energy monitoring, energy consumption, lighting, appliances and vehicles. Energy use is clearly an important aspect of campus sustainability.

#### 3.3.1 Solar Power

A 25 KV Solar energy system is established to reduce dependency on Grid power which is predominantly fossil fuel based. Green Energy Percentage is about 50%. In addition to decreasing an Institution carbon foot print, solar panels also generate a great deal of power. Our institution power bill is reduced by 50%. LED bulbs are used to reduce power consumption. Air conditioners are used at minimal temperatures for power conservation.

#### Observations:

- Average estimated production of units from solar system per day:100 units
- Average consumption of units per day from Grid before installation of solar energy system: 140-160 units
- Average consumption of units per day from Grid after installation of solar energy system:50-60% units



- As greenery is present all around the campus the utilization of Air conditioners is much reduced.

#### Recommendations:

Recommended to use solar powered UPS and Solar Street Lights.



### 3.4 Auditing of Green Area

The college campus is spread in about 13 acres of land and has green cover of about 60%, which includes road side trees, lawns, flower gardens, and medicinal plants. College has got about 50 to 60 various species of plants and few species of fauna.

Plants produce oxygen and give shelter to organisms. Plants produce wonderful therapeutic drugs to cure various normal and chronic diseases. Green area auditing includes plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards. This also helps in ensuring that the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programmes.

#### Observations:

- Huge number of variety of trees of age above 50 years is found in our college campus.
- The Department of Botany reviews periodically the list of trees planted in the garden, allot numbers to the trees, give scientific names to the trees and maintains records.
- Botanical garden is being maintained at the Department of Botany which consists of lot of medicinal plants.
- A separate rose garden with Kashmir Roses of different colours and wild roses is maintained by the Botany Department.
- Polyalthia longifolia are planted either side of pedestrian friendly roads.
- It was observed that campus is having 10 trees of different species and among them 65 is of medicinal importance.
- Various tree plantation programs are being organized every year at college campus with the assistance of NSS & NCC units.

#### Recommendations

- Planting of more medicinal plants every year in the campus is compulsory.
- Plants of Bonsai variety can be maintained.

- Set up a nursery for plants to be distributed to the students.
- Set up vegetable and fruit plant gardens
- Promote environmental awareness as a part of course work in various curricular areas, independent research projects, and community service.
- Create awareness of environmental sustainability and take actions to ensure environmental sustainability.
- Establish a College Environmental Committee (CEC) that will hold responsibility for the enactment, enforcement and review of the Environmental Policy.



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### 3.4 Auditing of solid waste management

Production and disposal of plastic waste, paper waste, food waste and recycling comes under auditing of solid waste management. The possible ways of generation of solid waste in our college campus are from plants dry leaves, grass, food stuff, paper, glass, plastic, use and throw pens, single use water bottles, water packets, single use poly bags, electrical, electronic and packing materials ect.

#### Observations:

- The college has adopted steel cutlery replacing plastic glasses, plastic cups and disposable plates minimizing single use plastic generated in canteen.
- Single use plastic like packing material and cool drink bottles are still in use and may be phased out slowly by adopting feasible methods. However, these are being collected separately and disposed.
- Food wastes and non-biodegradable waste are collected in separate bins.
- Food waste is used by the canteen people for feeding their cattle.
- Non - biodegradable waste like metal cans and plastic are disposed to recyclers.
- The biodegradable waste (except paper) is transferred to the Vermi-Compost unit maintained by the Department of Zoology.
- Paper waste in any form is collected and separated carefully, stored in bags and finally disposed to the vendors.
- Metal waste and wooden waste is stored and given to authorized scrap agents for further processing.
- Single sided used papers reused for writing and printing in all departments
- Very less plastic waste is generated by departments and office.

#### Recommendations

- Installation of another vermiculture and compost units
- Students should be made more participative in solid waste management.
- Conduct seminars and workshops on environmental education
- Avoid plastic plates and plastic items in the college functions
- Declare the campus plastic free and arrange awareness programmes to make the campus plastic free





### 3.5 Auditing of liquid waste management

Liquid wastes that are generated in the institute are

- ✓ Septic tank effluents from various sanitary blocks.
- ✓ Water used for cleaning of utensils etc. from canteen and washing of hands.
- ✓ Wastewater from laboratories using chemicals
- ✓ Reject water from RO plant

#### Observations:

- ✓ College has got few open drains to convey this water. Wastewater generated from the toilets is disposed of into septic tanks located at different places in the campus.
- ✓ Canteen waste water is collected into separate drain and is being directed into natural drain passing near by the college campus.
- ✓ Chemical water generated from the laboratories is collected into 4 separate pits which are connected with the lab outlet pipes.
- ✓ The waste water generated by RO Plant is being channelized into separate drain and also used for floor cleaning.
- ✓ Waste water from taps is channelled into 4 small sink pits and one large pit to improve ground water level.

#### Recommendations:

- ✓ It is recommended to discard usage of RO and go for alternative means for drinking water.
- ✓ To establish a centralized sewage treatment plant based on bio-membrane or any environment friendly based technology to become zero discharge campus and avoid usage of fresh water for gardening.
- ✓ To employ better methods of cleaning of vessels in canteen to conserve water while maintaining hygiene.

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### 3.6 Auditing of E-Waste Generation

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. E-wastes mainly include electronic devices, such as computer systems, servers, monitors, electrical components, wires and any outdated machines etc.

#### Observations

- E-waste generated in the campus is very less in quantity
- E-wastes are disposed-off through authorized vendors.
- The E- waste and defective item from computer laboratory is being stored properly.
- The institution has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner

#### Recommendations

- It is recommended to collect e- waste from office and each department and keep in separate stores, and then transfer to disposal unit
- It is also recommended not to burn the waste electronic parts which produce poisonous gases.

## CHAPTER-IV: POST AUDIT REPORT

1. It is evidenced that the college continuously thrives to be environment friendly by effective utilization of the available resources without depleting them.
2. Regular annual investments made on developing greenery establishes the commitment of Management for Environment.
3. Green auditing is being conducted by the College every year.
4. Irrespective of the academic programmes, environmental education is a part of curriculum at AG & SG Degree College Vuyyuru for which there are two credits for the students.
5. There are 6 rainwater harvesting pits established at both administrative and academic campuses, foreseeing future needs of water.

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6. Specific waste management plans are adopted to manage solid waste in the campus but the use of plastic carry bags, cups/plates and flexi boards is observed inside the college.
7. All the blocks in the Campus should develop a garden in front of the building and the expenditure for the same may be met from the College Development Fund.
8. Green habitat concept is adopted in the college campus. Larger trees in the campus provide shade thus reducing the temperature in the campus.
9. Sufficient toilets are established in the campus but the separate toilets for differently disabled students should be modernized.
10. Contamination of water is less as most of the water utilized is from bore well.
11. College does not deal with any potentially hazardous chemicals except in Laboratories which are in very minute quantities and are disposed safely.
12. It is also observed that the college celebrates World Nature Conservation Day on 28<sup>th</sup> July, World Ozone Day on 16<sup>th</sup> September and National Pollution Day on 2<sup>nd</sup> December every year to bring awareness and environment consciousness in every student.

#### **Final Recommendations**

- The audit committee has given the following recommendations for better maintenance of green campus
- College should also offer consultancy projects on environmental auditing for other academic and research institutions
- To conduct seminars and workshops on environmental education
- More Rainwater pits can be prepared at appropriate places and restoration activities may be initiated to sustain the health of ponds in the campus
- For managing organic wastes, biogas plants may be established.
- Water purification treatment facilities in place of RO plant may be installed within the campus.
- Measures must be taken to avoid plastic plates, plastic items and flexi banners in the college.
- It is recommended to celebrate World Water Day on March 22<sup>nd</sup> to bring awareness on importance of water, to save water and rainwater harvesting techniques.



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Adusumilli Gopalakrishnaiah & Sugarcane Growers  
Siddhartha Degree College of Arts & Science,  
Vuyyuru-521 163, Krishna District







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Adusumilli Gopalakrishnaiah & Sugarcane Growers  
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## Green Field Survey 2020-21

S.No	Common Name of the Tree	Botanical Name	No .of Trees in the College Campus
1	Teak trees	Tectona grandis	67
2	Ashoka trees	Polyalthia longifolia	91
3.	Coconut Trees	Cocos nucifera	90
4.	Mango trees	Mangifera indica	8
5	Sapota trees	Achras sapota	4
6.	Erra turai	Delonix regia	4
7	Peltophorum	Peltophorum pterocarpum	6
8	Neem trees	Azadiracta indica	4
9	Ficus plants	Ficus species	56
10	Neredu trees	Syzygium cumini	1
11	Ganuga	Pongamia pinnata	9
12	Amla tree	Phyllanthus emblica	4
13	Indian Rosewood	Dalbergia sissoo	1
14	Rela	Cassia fistula	1
15	Nidra ganneru	Samania Samman	2
16	Cycas	Cycas religiosa	6
17	Auracaria(Christmas tree)	Auracaria sps	3
18	Royal palm	Roystonea regia	4
	Foxtail	archontophoenix	25
19	Traveller's Palm	Ravanela madagascariensis -	2

20	Duranta	Duranta plumeri	Many(Planted as border to lawn and roads)
21	<b>Medicinal plants</b> i)Tulasi ii)Kalabanda iii)Mint iv)Lemon grass v)Ashwa Gandha vi) Neem	Ocimum santum Aloe vera Mentha viridis Cymbopogon sps (1) Withania somnifera etc .( 0)	Nearly 78plants have been maintained in the botanical garden since 2007
22	Rose plants	Iris kashmiriana	50
	Rose plants	Rosa indica	20
23	Grandis palms	Roystonea regia	02
24	Rafix palms	Rhapis excelsa	10
25	Pandanas		60
26	Ficus sps	Ficus benjamina	50
27	Sensoria sps	Dracaena trifasciata	02
28	Dracina	Dracina coularoma	05
29	Juprus		8
30	Cycus sps	Cycas revoluta	10
31	Pencile pine	Encyclopedia britanica	09
32	Addaku	Bauhinia purpurea	04
33	Kalanchoie	Kalanchoie pinnata	4
34	Mandaram	Hibiscus rosa sinosis	30
35	Erra Chandanam	Red Sandal	10
36	Ornamental plants		100



37	Water apple	Syzygium samarangense	3
38	Ornamental plants	(Mary gold & rose plant )	50
49	Coleus bloomi	Coleus amboinicus	02
50	Money plant	Epipremnum aureum	04
51.	Acalypha red	Acalypha hispida	Many(Planted as border to lawn and roads)
52	Acalypha green	Acalypha wilkesiana	Many(Planted as border to roads)
53	Bridal bouquet	Plumeria pudica	Many



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3.	Coconut Trees	Cocos nucifera	50
4.	Mango trees	Mangifera indica	8
5	Sapota trees	Achras sapota	4
6.	Erra turai	Delonix regia	5
7	Peltophorum	Peltophorum pterocarpum	20
8	Neem trees	Azadiracta indica	6
9	Ficus plants	Ficus species	50
10	Neredu trees	Syzygium cumini	2
11	Ganuga	Pongamia pinnata	9
12	Amla tree	Phyllanthus emblica	3
13	Indian Rosewood	Dalbergia sissoo	1
14	Kouravulu Pandavalu Creeper	Couraopitha gynandropis	1
15	Australian tumma Tree	Acacia milaoxylon	1
16	Rela	Cassia fistula	1
17	Nidra ganneru	Samania Samman	2
18	Cycas	Cycas religiosa	6
19	Auracaria(Christmas tree)	Auracaria sps	2
20	Thuja(Christmas Tree)	Thuja sps	10
21	Traveller's Palm	Ravenala madagascariensis	3
22	Juprus	Juniperus communis	8
23	Rose plants		200
24	Grandis palms	Licuala grandis	2
25	Rafix palms	Rhapis excelsa	20
26	Pandanas	<i>Pandanus amaryllifolius</i>	100
27	Sensoria sps		30
28	Dracina coularoma	Dracaena marginata	01
29	Cycus sps		10
30	Kalanchoie	Kalanchoe blossfeldiana	4
31	Mandaram	Hibiscus rosa sinuses	20
32	Erra Chandanam	Red Sandal	10
33	Ornamental plants		20
34	Baheniya plants	Bauhinia blakeana	2



35	Naga malli trees	<i>Couroupita guianensis</i>	2
36	kabandam	<i>Neolamarckia cadamba,</i>	2
37	Aedu akula pala	<i>Alstonia scholaris,</i>	7
38	Tella maddhi	Terminalia arjuna	4
39	Regu chettu	<i>Ziziphus jujuba</i>	1
40	Water apple	<i>Syzygium samarangense</i>	2
41	Star fruit	<i>Averrhoa carambola</i>	2
42	Bengall usiri	<i>Averrhoa bilimbi</i>	2
43	Tanikaya	Terminalia bellirica,	1
44	Chintha chettu	Tamarindus indica	1
45	Seetha phalam	Annona squamosa	2
46	Rama phalam	<i>Annona reticulata</i>	2
47	Jack fruit	Artocarpus heterophyllus	2
48	Oil palm	<i>Elaeis guineensis</i>	2
49	Royal palm	Roystonea regia	2
50	vavilaku	Vitex Negundo	1
51	vakkaya	<i>Carissa carandas</i>	2
52	Night queen	Cestrum nocturnum	1
53	Hemiliya	<i>Hamelia patens</i>	1
54	Punnaga puvvulu	Millingtonia hortensis	1
55	Golden flower trees	Cassia fistula	1
56	<b>Medicinal plants</b>		
57	Tulasi	Ocimum sanctum	4 types
58	Vamu aaku	Coleus amboinicus Lour	2 types
59	kalabandha	Aloe vera	2 types
60	Insulin plant	<i>Chamaecostus cuspidatus</i>	1
61	Poda pathri	<i>Gymnema sylvestre</i>	1
62	Bryophillum	Kalanchoe pinnata,	2
63	Nela vemu	Andrographis paniculata	2
64	Jade	Crassula ovata	6
65	Arva laneta	Aerva lanata	1
66	Mint	<i>Mentha piperita</i>	1
67	asparagus	<i>asparagus</i>	1
68	Sugandha pala veru	Hemidesmus Indicus	2
69	Sarpagandhi	Rauwalfia serpentine	6
70	Tella eswari	<i>Aristolochia indica</i>	2
71	Billa ganneru	Catharanthus roseus	2
72	Pippalu	Piper longum	2
73	Tamala paku	Piper betle	2
74	Atika mamidi	Boerhaavia diffusa	2
	Kagithapu puvvulu mokka	<i>Bougainvillea glabra</i>	15
75	Pogada	Mimusops elengi	2
76	Bottle brush	Callistemon citrinus	1

77	Jama	<i>Psidium guajava,</i>	4
78	Kashmir roses	ROSA EE `KASHMIR	400
79	Ixora	Ixora coccinea	6
80	mandara	Hibiscus rosa-sinensis	7
81	Desert rose	Adenium obesum	3
82	crotans	Crotan varigata	6
83	Tecoma (red,yellow)	Tecoma stans.	4
84	Nalla pasupu	Curcuma Caesia	1



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6.	Erra turai	Delonix regia	5
7	Peltophorum	Peltophorum pterocarpum	20
8	Neem trees	Azadiracta indica	6
9	Ficus plants	Ficus species	50
10	Neredu trees	Syzygium cumini	2
11	Ganuga	Pongamia pinnata	9
12	Amla tree	Phyllanthus emblica	4
13	Indian Rosewood	Dalbergia sissoo	1
14	Kouravulu Pandavalu Creeper	Couraopitha gynandropis	1
15	Australian tumma	Acacia milaoxylon	1
16	Rela	Cassia fistula	1
17	Nidra ganneru	Samania Samman	2
18	Cycas	Cycas religiosa	6
19	Auracaria(Conifer)	Auracaria sps	2
20	Thuja(Christmas Tree)	Thuja sps	10
21	Traveller's Palm	Ravenala madagascariensis	4
22	Juprus	juniperus communis	8
23	Rose plants	Rosa indica	200
24	Grandis palms	Licuala grandis	2
25	Rafix palms	Rhapis excelsa	20
26	Pandanas	Pandanus amaryllifolius,	100
27	Sensoria sps	<i>Dracaena trifasciata</i>	30
28	Dracina coularoma	Dracaena marginata	01
29	Cycus sps	Cycas revoluta	10
30	Kalanchoie	Kalanchoe blossfeldiana	4
31	Mandaram	Hibiscus rosa sinuses	20
32	Erra Chandanam	Red Sandal	10
33	Ornamental plants	-----	20
34	Baheniya plants	Bauhinia blakeana	2
35	Naga malli trees	<i>Couroupita guianensis</i>	2
36	kabandam	<i>Neolamarckia cadamba,</i>	1

37	Aedu akula pala	<i>Alstonia scholaris,</i>	7
38	Tella maddhi	<i>Terminalia arjuna</i>	4
39	Regu chettu	<i>Ziziphus jujuba</i>	1
40	Water apple	<i>Syzygium samarangense</i>	2
41	Star fruit	<i>Averrhoa carambola</i>	2
42	Bengal usiri	<i>Averrhoa bilimbi</i>	2
43	Tanikaya	<i>Terminalia bellirica</i>	1
44	Karaka	<i>Terminalia chebula</i>	1
45	Chintha chettu	<i>Tamarindus indica</i>	1
46	Seethaphalam	<i>Annona squamosa</i>	2
47	Lakshma phalam	<i>Annona Muricata</i>	2
48	Rama phalam	<i>Annona reticulata</i>	2
49	Jack fruit	<i>Artocarpus heterophyllus</i>	2
50	Dragon fruit	<i>Dracaena trifasciata</i>	3
51	Fashion fruit	<i>Passiflora edulis</i>	1
52	Kasi maredu	<i>Aegle marmelos</i>	1
53	Bixa(food colour plant)	<i>Bixa orellana</i>	1
54	Oil palm	<i>Elaeis guineensis</i>	2
55	Royal palm	<i>Roystonea regia</i>	2
56	vavilaku	<i>Vitex Negundo</i>	1
57	vakkaya	<i>Carissa carandas</i>	2
58	Night queen	<i>Cestrum nocturnum</i>	2
59	Hemiliya	<i>Hamelia patens</i>	11
60	Punnaga puvvulu	<i>Millingtonia hortensis</i>	1
61	Golden flower trees	<i>Cassia fistula</i>	5
62	Nalleru	<i>Cissus quadrangularis</i>	2 types
63	Nepalam	<i>Jatropha gossypifolia</i>	1
64	Buddha belly	<i>Jatropha podagrica</i>	2
65	Jeedi mamidi	<i>Anacardium occidentale</i>	1
66	Sweet narinja	<i>Citrus sinensis</i>	1
67	Pampara panasa	<i>Citrus maxima,</i>	1
68	Kagita puvvu	<i>Bougainvillea glabra</i>	6
69	Tulasi	<i>Ocimum sanctum.</i>	4 types
70	Vamu aaku	<i>Coleus amboinicus</i>	2 types
62	kalabandha	Alove veera	2 types
63	Insulin plant	<i>Chamaecostus cuspidatus</i>	1
64	Poda pathri	<i>Gymnema sylvestre</i>	1
65	Bryophillum	<i>Kalanchoe -Bryophillum</i>	1
66	Nela vemu	<i>Andrographis paniculata</i>	2
67	Jade	<i>Crassula ovata</i>	10
68	Arva laneta	Arva laneta	2
69	Mint	<i>Mentha piperita</i>	5
70	asparagus	asparagus secates	5
71	Sugandha pala veru	<i>Hemidesmus Indicus.</i>	2
72	Sarpagandhi	<i>Rauwolfia serpentina</i>	4



73	Tella eswari		2
74	Billa ganneru	<i>Catharanthus roseus</i>	2
75	Pippalu	Piper longum	2
76	Tamala paku	<i>Piper betle</i>	2
77	Atika mamidi	<i>Boerhaviaa diffusa</i>	2
78	Kagithapu puvvulu mokka	Bougainvillea glabra	15
79	Pogada	<i>Mimusops elengi</i>	2
80	Bottle brush	<i>Callistemon coccineus</i>	1
81	Jama	Psidium guajava	4
82	Kashmir roses	Rosa 'Kashmir',	400
83	nuruvarahalu	<i>Ixora coccinea,</i>	6
84	mandara	Hibiscus rosa-sinensis	7
85	Desert rose	Adenium obesum	1
86	crotans	Codiaeum variegatum	6
87	Tecoma (red,yellow)	Tecoma stans.	4
88	Nalla pasupu	Curcuma caesia	1
89	Paciflora	Passiflora incarnata	1
90	Silver dust	Silver dust	
91	Pine	<i>'Pinus roxburghii'.</i>	1
92	Minigeranium	Geranium pusillum	1
93	Legas stomia	<i>Lagerstroemia speciosa</i>	2
94	Valu jada	Phyllodium longipes	2
95	Legas stromia	Lagerstroemia indica,	2
96	Crynam lily	Crinum xanthophyllum	4





# ADUSUMILLI GOPALAKRISHNAIAH & SUGARCANE GROWERS SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE

Vidyuru-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

Principal

Adusumilli Gopalakrishnaiah & Sugarcane Growers  
Siddhartha Degree College of Arts & Science,  
Vidyuru-521 165, Krishna District.



## MEMBERS OF ENERGY AUDIT COMMITTEE

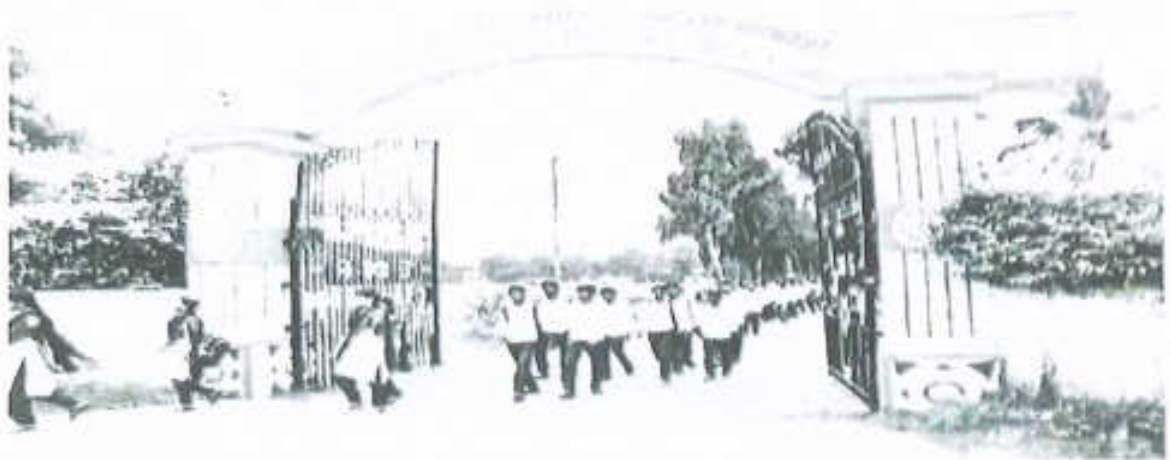
### Internal Committee

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 Department of Physics  
S.D. & S.G.S. DEGREE COLLEGE  
VIJAYAWADA-521 105.

2. M. Sateesh

3. M.P.D. Parimala



### Member External Committee

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

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

*J.V.L.*  
DISTRICT MANAGER  
N.R.E.D.C.A.P.  
KRISHNA & N.T.R. DISTRICTS

*J.V.L.*  
Principal  
Adusumilli Gopalakrishnaiah & Sugarcane Growers  
Siddhartha Degree College of Arts & Science,  
Vijayawada-521 165, Krishna District

## 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. Satyanarayana and NAAC coordinator Dr.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.

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Siddhartha Degree College of Arts & Science,  
Vuyyuru-521 165, Krishna District.



## **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%.



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Energy conservation means reduction in energy consumption without making any sacrifice of 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 things by collecting exactly data form survey.

#### •General:

The A.G & S.G Siddhartha Degree College of Arts and Science (AUTONOMOUS), Vuyyuru Entrusted 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.



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## Electricity Solar Grid connected solar plant (25 kW)

### SOLAR PANELS



Pictures of Solar Power Plant



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**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
<b>Total units = 37,342</b>			<b>Avg: 0.61</b>

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



Principal

### 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



Principal



### 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	LED Tube 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	laptop	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



Principal



## 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	LED Lights	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



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### 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	Refrigrator	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	Refrigrator	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



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### 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



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## General Recommendations

- All Class Rooms and labs to have Display Messages regarding optimum use of electrical appliances in the 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 after 10 minutes/30 minutes.
- The comfort/Default air conditioning temperature to be set between 24°C to 26°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.



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**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 COLLEGE FOR BETTER UNDERSTANDING**

**DEPARTMENT OF PHYSICS**  
**AG & S G SIDDHARTHA DEGREE COLLEGE, VUYYURU.**  
**ವಿದ್ಯುತ್ ಮತ್ತು ಶಕ್ತಿ**

ವಿದ್ಯುತ್ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲವು 30% ರಷ್ಟು ಸ್ವಲ್ಪವಾಗಿ ಬಳಸುವುದು ಮತ್ತು ಸಂರಕ್ಷಿಸುವುದು ಅಗತ್ಯವಿದೆ. ಇದು ಅಧಿಕಾರಿ ಮತ್ತು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಸ್ವಲ್ಪವಾಗಿ ಬಳಸುವುದು ಮತ್ತು ಸಂರಕ್ಷಿಸುವುದು ಅಗತ್ಯವಿದೆ. ಈ ಕೆಳಕಂಡಂತಿರುವ ಸೂಚನೆಗಳನ್ನು ಅನುಸರಿಸಿ ಮತ್ತು ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲವನ್ನು ಸಂರಕ್ಷಿಸಿ ಮತ್ತು ಸಂರಕ್ಷಿಸಿ. ಈ ಕೆಳಕಂಡಂತಿರುವ ಸೂಚನೆಗಳನ್ನು ಅನುಸರಿಸಿ ಮತ್ತು ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲವನ್ನು ಸಂರಕ್ಷಿಸಿ ಮತ್ತು ಸಂರಕ್ಷಿಸಿ.

ಸ್ವಲ್ಪವಾಗಿ ಬಳಸುವುದು	ಶಕ್ತಿ (Watt)	ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ ಗಂಭೀರತೆ	ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ ದರ
ಗ್ಲೋ	40	6	7
ಗ್ಲೋ	60	6	11
ಲ್ಯೂಮಿನಿಸ್ಕೆಂಟ್ ಗ್ಲೋ	40	10	12
ಪಿಪ್ಪಿ ಗ್ಲೋ	15	10	4.5
ಪಿಪ್ಪಿ ಗ್ಲೋ ಸಂರಕ್ಷಿಸುವುದು	5	10	1.5
ಪಿಪ್ಪಿ	60	16	27
ಪಿಪ್ಪಿ	175	8	42
ಪಿಪ್ಪಿ	1500	6	270
ಪಿಪ್ಪಿ	225	15	101
ಪಿಪ್ಪಿ	450	1	13.5
ಪಿಪ್ಪಿ	800	0.5	12
ಪಿಪ್ಪಿ	1000	1	30
ಪಿಪ್ಪಿ	1500	1	45
ಪಿಪ್ಪಿ	1500	1	45
ಪಿಪ್ಪಿ	3000	1	90
ಪಿಪ್ಪಿ	1000	1	30
ಪಿಪ್ಪಿ	700	0.5	11
ಪಿಪ್ಪಿ	300	1	9
ಪಿಪ್ಪಿ	750	1	22.5
ಪಿಪ್ಪಿ	100	10	50
ಪಿಪ್ಪಿ	50	2	3

ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ :  
 ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ 100 ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ 4 ಗಂಭೀರತೆ 30 ಗಂಭೀರತೆ ಅಂದರೆ ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ  
 1 ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ = 1000 ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ (KWH) ; 1000\*4\*30 = 12000 ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ  
 1 ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ = 5 ರೂ. ಅಂದರೆ ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ 12\*5 = 60/- ಅಂದರೆ ಶಕ್ತಿ ಮತ್ತು ಶಕ್ತಿ ಸಂಪನ್ಮೂಲ.

**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

$100 \times 4 \times 30 = 12000 \text{ watts} = 12 \text{ Units. (1 unit = 1000 watts/hr)}$

If 1 Unit Cost is Rs.5/- then Total Cost =  $12 \times 5 = 60/-$ .



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## 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 from 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.



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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. If 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.



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## 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.

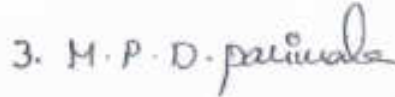
Audit Report by :

### 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.   
HEAD OF THE DEPT. OF PHYSICS  
AG & S.G DEGREE COLLEGE  
VUYURU-521 165.

2.   
M. Sateesh

3.   
M.P.D. Parimala

### External Committee

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

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

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

  
Principal  
Aduasani Gopalakrishnaiah & Sugarcane Grower  
Siddhartha Degree College of Arts & Science,  
Vuyyuru-521 165, Krishna District.