

# JAYAMUKHI COLLEGE OF PHARMACY

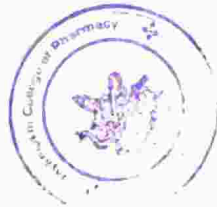
MOQDUMPURAM, NARSAMPET, WARANGAL RURAL


## 7.1.4- DVV

HEI HAS ENCLOSED THE DOCUMENTS AS REQUIRED BY NAAC

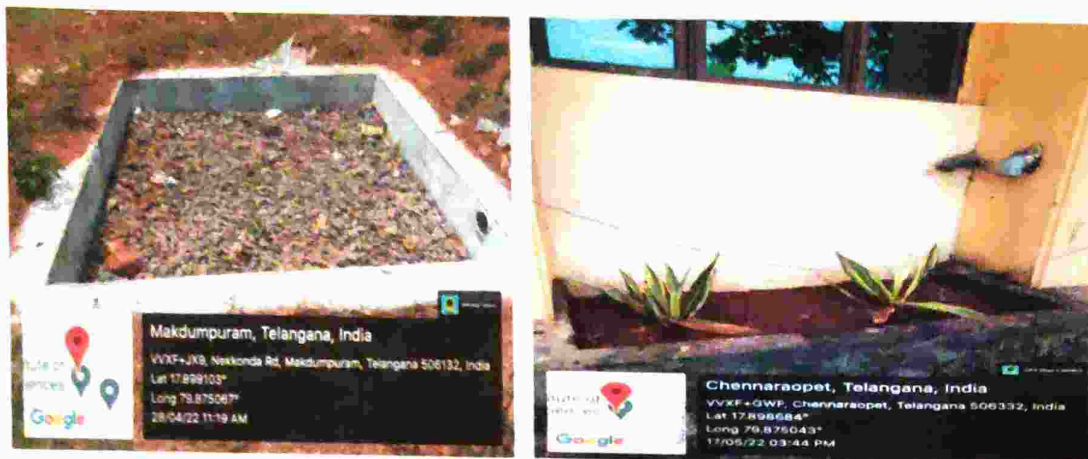
ENCLOSED DOCUMENTS IN 7.1.4

1. GEOTAGGED PHOTOGRAPHS WITH CAPTIONS OF THE FACILITIES PROVIDED
2. BILLS FOR THE PURCHASE OF THE EQUIPMENT UNDER THIS METRIC
  - A) RAIN HARVESTING PITS CONSTRUCTION BILL
  - B) OPEN WALL CONSTRUCTION AROUND THE WELL
3. COMPLETE GREEN AUDIT REPORT
  - A) WATER CONSERVATION REPORT



  
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### Rain Water Harvesting:



Rain water harvesting pits in the campus

Roof top rain water harvesting is done by collecting the rain water on the roof through piping system into rain harvesting pits increasing ground water level.

Rain water harvesting pits constructed in the institute collecting direct rain water ensuring recharge in the ground water level.

### Borewell /Open Well Recharge:

Campus relies on bore and open well for its water supply as it is not connected with municipal water supply. Bore- well and open-well constructed in the campus is recharged through rainwater and water harvesting methods, used for different purposes such as drinking water after purification process, in watering garden and supply to different parts of the campus such as laboratories and rest rooms etc.



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Open well and bore well in the campus

**Construction of Tanks and Bunds:**

Campus is constructed with overhead tanks to store water with a capacity of 50,000 liters used to supply to different parts of campus. Purified water is supplied through refrigerators supplying cool water to attendees of the campus



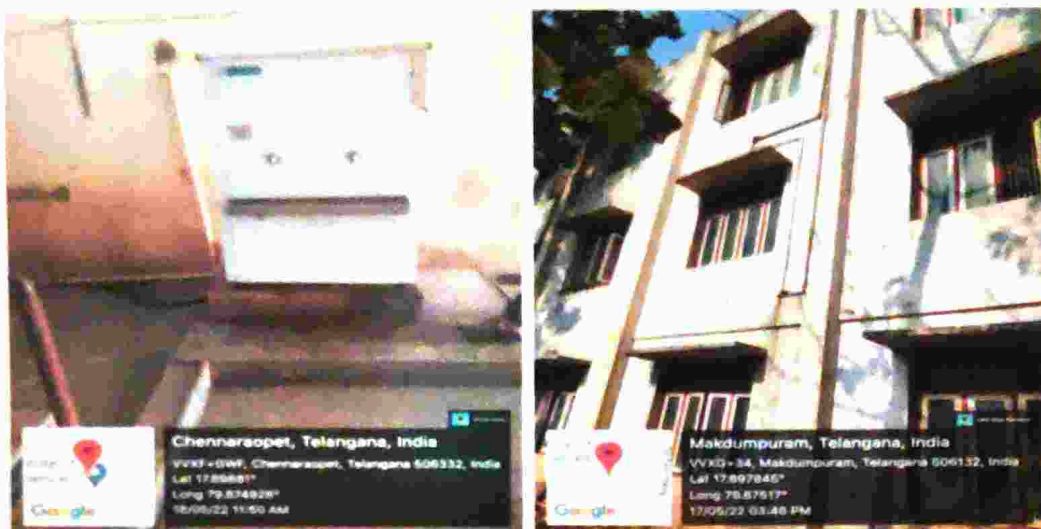
Water tanks in the campus



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### Maintenance of Water Bodies and Distribution System in the Campus:



Water distribution system in the campus

Water bodies like ground level storage tanks are constructed in the campus which stores water and connected to supply water to different parts of the campus. Institute has well distribution system such as water supply and draining system.

Campus is constructed with surface drainage system transporting surface flow of water and waste water through outlet.



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# NEWCASTLE CONSTRUCTIONS

## ARCHITECTS AND ENGINEERING CONSULTANTS

**2. Er. Syed Irfanullah Hussaini**  
Master of Technology  
Structural and Construction Engineering  
Director Newcastle Constructions

our services:

1. Planning and structural designing
2. building municipal permissions
3. estimation and costing
4. surveying and mapping
5. renovations and Maintenance
6. Architects and interior designing.

Date: 16-12-2020

Contract of construction at site located at Jayamukhi College of pharmacy Narsampet, services offered by new castle construction of Rain Harvesting Pits Project. To the Owners: Jayamukhi College of Pharmacy

Duties and responsibilities of new castle constructions:

The agreement is between the two parties Party A and Party B. Party A is Jayamukhi College of pharmacy and, Party B is (Newcastle Constructions). The two Parties agreed to a certain point those are followed.

Specifications:

1. Form Rain Water harvesting pits of size 10x10x8.
2. One "1" rain harvesting pits need to construct.
3. All the materials required for constructions, excavation for harvesting pit and all the other charges for construction of harvesting pit is under this contract only.

Cost of Constructions:

S.NO	Particulars	For Each Pit
1.	Earth work excavation for rainwater harvesting	2,400
2.	Bricks	16,500
3.	20mm coarse aggregate	7,500
4.	40mm coarse aggregate	8,000
5.	Sand	8,000
6.	Workers and Mason Charges	10,000
Grand Total		52,400

For Construction of 1 Rainwater Harvesting Pit Rupees 52,400/- (Fifty Two Thousand Rupees Four Hundred Rupees only)

Party A

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Party B



NEWCASTLECONSTRUCTIONS

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Specifications:

1. For open wall construction around well.

Cost of Constructions:

S.NO	Particulars	For Each Pit
1.	Open wall construction around well	16300

For Construction of 1 Rainwater Harvesting Pit Rupees 16,300/- (Sixteen Thousand Three Hundred Rupees only)

  
Party A Principal  
Jayamukhi College of Pharmacy  
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Party B



NEW CASTLE CONSTRUCTIONS



## Water Conservation, Harvesting and Management

Per capita water availability of many river basins in India is declining over the years due to sustained population pressure, agriculture and industrial expansion, besides changing climate scenarios. This is particularly evident from the fact that the per capita availability has decreased from 1816 m<sup>3</sup>/year in 2001 to 1545m<sup>3</sup>/year in 2011.

Rainwater harvesting is a technique used for collecting, storing and using rainwater for domestic, agricultural or any other uses. The rainwater is collected from various hard surfaces such as rooftops, runoff from catchments, from streams and water conservation through watershed management or other manmade aboveground hard surfaces. It is an age-old system of collection of rainwater for future use. The harvested water can be stored on surface through ponds and tanks or can be recharged to groundwater.

### Protection of Water from Pollution;

If the total fresh water available on the earth remains pollution free, it is sufficient to meet the drinking water needs of the existing population of the world, unfortunately a large portion of fresh water does not remain fit for use of the living world due to increasing economic activities, urbanization etc.

### Rational Use of Groundwater:


Groundwater meets 25 per cent of total supply of water in the world, remaining 75 per cent supply is met by surface water sources of rivers, lakes etc. Demand for groundwater goes on increasing in proportion to its available quantity due to which quantity of groundwater goes on decreasing. After exploitation of groundwater, its re-infiltration takes a very long time to complete. Hence, groundwater exploitation should be only in proportion to its recharging capacity.

### Increasing Forest Cover:

According to hydrological movements, water is received through rainfall every year different quantities on the surface of the earth. This water flows on the surface and reaches the seas. Some part of rainwater is stored in stable water reservoirs (lakes and tanks), whereas some quantity of water infiltrates into the land and takes the form of groundwater.

**Our Case: It is proposed to Construct Water harvesting Pits 2 No's , It is also proposed to install ECO LOO , water conserving Toilets , this may result in 6 KL /day**



  
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## Audit Framework and detailed findings of the Audit

Objective	Observation/ Present status	Remarks / Recommendation
Green Cover - Plantation of Trees	Plantation of trees is started in the campus and the green cover is extended every year in the campus. At Present 14.67 Acres campus is having the Green cover.	A Continual plantation of trees is going on. A total area of 14 Acres is having greenery.
Renewable Energy – Harness Solar Power , Wind Power etc	A Grid Connected Solar PV plant is proposed to be installed with capacity of 100 KW very shortly.	It is recommended to Install the solar PV roof top plants to harness solar energy.
Water Conservation – i) Rain Water harvesting  ii) Eliminating Leaking Taps  iii) Avoid Misuse/wastage of water	<p>i) It is proposed to construct Rain water Harvesting pits</p> <p>ii) A Dedicated Team working on the repairing the leaking taps across the campus</p> <p>iii) RO Plant is installed for providing safe drinking water, which generates RO reject water, this water is used for Gardening.</p> <p>iv) Encourage to reduce the water usage by displaying mesaages</p> <p>v) It is recommended to install Water Sprinkler system installation is initiated to save water</p>	<p>They will be functional very shortly.</p> <p>Most of the taps are repaired, It is recommended to install taps with reduced water flow like shower / Mist.</p> <p>Reward the personnel informing Leaky taps, Paste Labels where ever water is expected to be wasted. Process initiated</p> <p>It is recommended to Install a Aqua Conditioner to reduce the RO Reject.</p> <p>Recommended to install Bio Toilets/Water Less Toilets like ECO Loo which reduces water usage and generates fertilizer from human waste and Natural liquid from the Urine which can be reused for gardening. Under process</p>





# Green Audit Report

On



## JAYAMUKHI COLLEGE OF PHARMACY

Narsampet, Warangal (R), 506 332)

(Affiliated to Kakatiya University)

FEB 2022

Submitted by



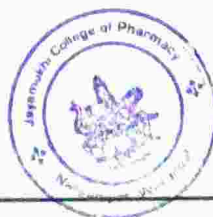
**SRI GAYATRI ENERGY SERVICES**

*we support you conserve*

Flat :401, SS Enclave, 2-1-255, St. No:14, Nallakunta, Hyderabad, M:9848050598

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Sri Gayatri Energy Services



*S. Venkatesh*  
Principal  
Jayamukhi College of Pharmacy  
Narsampet-506 332  
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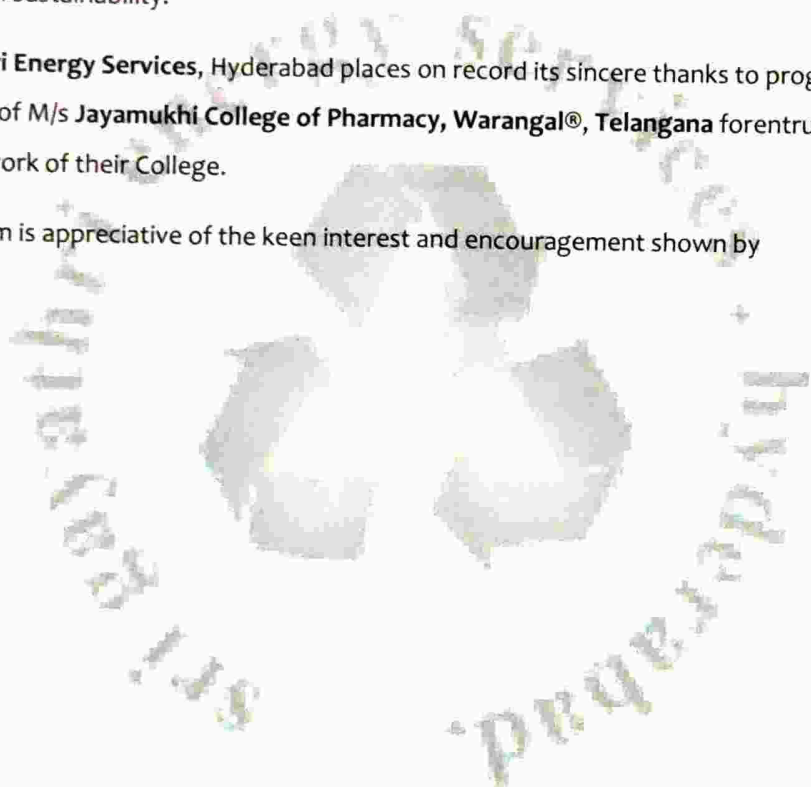
## Introduction of Green Audit

### Acknowledgement

The Green audit conducted is an external audit that aims towards creating awareness healthy and sustainable environment. Though nascent, the initiative is taken up to foster the concept of environmental sustainability.

M/s **Sri Gayatri Energy Services**, Hyderabad places on record its sincere thanks to progressive management of M/s **Jayamukhi College of Pharmacy, Warangal®**, **Telangana** foretrusting the Green Audit work of their College.

The study team is appreciative of the keen interest and encouragement shown by



*S. Ramesh*  
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We trust the data provided by the M/s **Jayamukhi College of Pharmacy, Warangal**, personnel is true to their best of knowledge and we didn't verify the correctness of it.



  
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Audit Study team

Shri D.S.R.Murthy

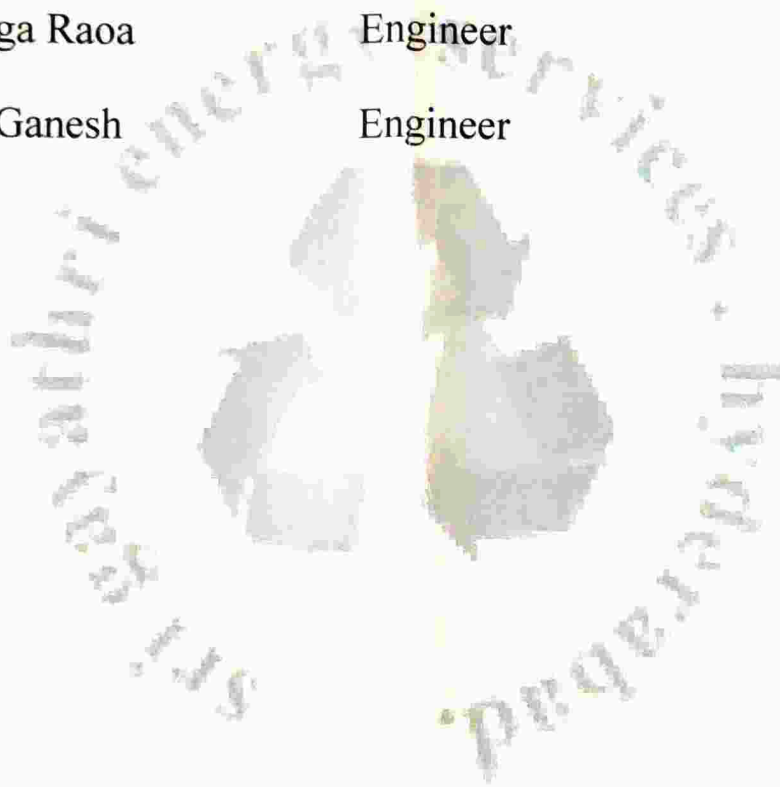
Senior Energy Auditor

Shri Durga Raa

Engineer

Shri Sai Ganesh

Engineer



A handwritten signature in green ink, appearing to be "S. D. Murthy".

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## Executive Summary of Observations

1. A Detailed Green Audit is carried out at the Campus with following observations.
2. The plantation of Trees is a continual process which is under implementation the total green area coverage is 59398.367 Sq M which is mandatory for mitigating the Global warming. (Photos enclosed)
3. The Campus is having 100 KWp Grid Connected Solar PV Plant, It is recommended to enhance further 50 KWp capacity.
4. It is recommended to rectify / repair the leaky taps and construct the water harvesting pits
5. Waste Management is segregated in to three categories like
  - i) Non Bio Degradable Waste (Plastic/ Other) are collected in the dust bins located at various locations in the campus. It is proposed to Ban/ discourage the usage of plastic water bottles inside the campus (Enclose Photos of Dust bins). The Waste is picked up by vendor
  - ii) Biomedical waste: microbial media and pharmacological waste generated during laboratory work is sterilized in autoclave and packed in safety bags and handed over to municipality.
  - iii) E Waste Management MOU is signed with GHMC for picking up the E waste generated annually and dispose the E waste in eco- friendly way .(Enclose copy of MOU)
6. It can be concluded that the Green Audit initiatives are started and College Management recognized the importance and taking proactive steps towards sustainable environment.



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## Green Audit scope of work

The Green Audit is carried out in view of assessing all necessary environmental components and their impact on the campus physically by visiting the premises with reference to following.

1. Identifying the Green Area in total area of the campus and process of planting trees so that Heat /Global warming is mitigated. Creating awareness among staff/Students to plant more trees in campus. A continual drive is created.
2. Water Conservation/ Efficient Usage / Eliminate the water misuse or wastage , Rain Water Harvesting etc
3. Renewable Energy usage to reduce the fossil fuel dependency, Harvest the Solar Power
4. Waste Management which includes Bio Waste/ Non Bio Waste/ E Waste etc
5. Carbon Foot Print – Transportation of Teaching Staff / Non Teaching Staff/ Students

## METHODOLOGY

The Green Audit taken up by the college had been divided into two stages:

**The Audit Stage:** The Audit Stage encompasses of the team selection and the field works to be performed. The Green Audit Team focused on various Issues pertaining to college which have the highest influence on the Green Attributes of the College. The Audit stage also focused on the Methodology adopted. Checklist approach is adopted for transparent evaluation of the topics and increase readability for independent reader.

**The Post Audit Stage:** The post-audit stage ensures formulation of Draft findings and sent to management response. After getting draft approval, the audit team went for final report formulation.

### **Project Schedule:**

- |                      |            |
|----------------------|------------|
| 1. Audit             | : 1-2 days |
| 2. Report generation | : 1 Week   |



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## Introduction of the Institution

Sponsored by the Jayamukhi Educational Society, the Jayamukhi College of Pharmacy came into being in 2005 to provide quality and contemporary education with social relevance in the engineering faculty with an ultimate vision to maintain global standards in higher learning and research. The Institute has the approval of AICTE and recognized by the Government of Telangana. It is an affiliated college of Kakatiya university, Warangal.

The Jayamukhi educational society has come upon 40 acres of green pastures in Narsampet, about 30km away from the historic city of Warangal and presents a picturesque and panoramic view. JCPN offers B pharmacy, M pharmacy and Pharm D courses.

### STATEMENT OF ASSURANCE

The Green Audit conducted for the Third time in the college. The Management had taken initiative to carry out the Green Audit externally. As mentioned above it is in the process of improving the awareness towards the renewable energy and sustainable development. The conclusions are based on a comparison of the situations as they existed at the time of the audit. The evidences presented are in support of the conclusions.



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## Goals of the College

Enhancing an environmentally literate campus where students can learn the idea of protection of environment and stay healthy. The college Management is proactively working on these several facets of "Green Campus" including Plantation of more trees, Water Conservation, Efficient water usage by eliminating leaking water taps, Installation of ETP, Water Harvesting Pits and interconnecting them to recharge the Ground Water table. Effective Waste Management which includes Food Waste, Plastic, Paper, Metal Work, Renewable Energy, carbon footprints etc.

1. To create a green campus with focus on above concepts
2. To Harness Solar Power
3. To Conserve Water by eliminating the water leakages , wastage, Rain Water Harvesting
4. To Reduce Waste management through reduction of Food waste generation, Plastic/Paper/Metal waste generation and effective disposal
5. To Reduce the Carbon Foot print
6. Enhancement of college profile



  
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## ENVIRONMENT

1. **Plantation of Trees:** The college management made it a practice to plant trees across the campus to improve greenery. This is a continual ongoing process and every year a target is taken to plant trees and increase the Green cover inside the campus. The Following are the objectives kept in mind for increasing the Green Area coverage inside the campus and internal in the buildings too.

### **Reducing Climate Change**

If people are good at something, then it is building up excess carbon dioxide in the atmosphere. Harmful CO<sub>2</sub> contributes to climate change, the biggest current problem the world has to deal with. Trees, however, help fight it. They absorb CO<sub>2</sub> removing it from the air and storing it while releasing oxygen. Annually, an acre of trees absorbs the amount of carbon dioxide equal to driving your car 26 000 miles. Trees are our main survival tools; only one tree can produce enough oxygen for four people.

### **Purifying Air**

Trees do purify the air. They absorb pollutant gases such as nitrogen oxides, ozone, ammonia, sulfur dioxide. Trees also absorb odors and act as a filter as little particulates get trapped in leaves. A mature acre of trees can yearly provide oxygen for 18 people.

### **Cooling Down the Streets**

The average global temperature grew by 1.4 F. This happens as tree coverage declines. Removing trees and replacing them with heat absorbing asphalt roads and buildings makes cities much warmer. Trees are cooling cities by up to 10 F by providing shade and releasing water.

### **Natural Air Conditioning**

Architects and environmentalists came up with the great solution – green roofs. Green roofs are an amazing way to incorporate vegetation to our Premises and provide environmental benefits. Indoor trees do not only have a calming effect, they also act as natural air conditioning.

### **Saving Water**

Except for cooling, trees also help to save water. Because of the shade they provide, water will evaporate slowly from low vegetation. Trees need about 15 water gallons a week to survive, and they release about 200-450 gallons of water per day.

**Our Case: Almost 14.677 acres of Tree plantation out of 25 Acres of the campus is having tree plantation and heading for area of Greenery**



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**Renewable Energy:** The campus is having enough area to install Grid Connected Solar PV in the campus. The campus installed 100 KWp solar PV to harness Solar Power from NOV 19.

Among all the benefits of solar energy the most important thing is that solar energy is a truly renewable energy source. It can be harnessed in all areas of the world and is available every day. We cannot run out of solar energy source.

**Solar System** has generated energy, the energy bills will drop. How much you save on bill will be dependent on the size of the solar system and electricity usage. Moreover, not only will you be saving on the electricity bill, there is also a possibility to receive payments for the surplus energy that you export back to the grid. If you generate more electricity than you use (considering that your solar panel system is connected to the grid).

**Some of the key benefits of solar energy on the environment include:**

- Using less water. Water is one of our most precious natural resources. ...
- Reducing air pollution. ...
- Help to slow climate change. ...
- Reducing your household's carbon footprint. ...
- Reducing our reliance on fossil fuels.

**Our Case : Presently installed 100 KW Grid Connected Solar PV to Harness the Solar Power**



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## Water Conservation, Harvesting and Management

Per capita water availability of many river basins in India is declining over the years due to sustained population pressure, agriculture and industrial expansion, besides changing climate scenarios. This is particularly evident from the fact that the per capita availability has decreased from 1816 m<sup>3</sup>/year in 2001 to 1545m<sup>3</sup>/year in 2011.

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### Protection of Water from Pollution;

If the total fresh water available on the earth remains pollution free, it is sufficient to meet the drinking water needs of the existing population of the world, unfortunately a large portion of fresh water does not remain fit for use of the living world due to increasing economic activities, urbanization etc.

### Rational Use of Groundwater:


Groundwater meets 25 per cent of total supply of water in the world, remaining 75 per cent supply is met by surface water sources of rivers, lakes etc. Demand for groundwater goes on increasing in proportion to its available quantity due to which quantity of groundwater goes on decreasing. After exploitation of groundwater, its re-infiltration takes a very long time to complete. Hence, groundwater exploitation should be only in proportion to its recharging capacity.

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## Waste Management:

1. **Biodegradable Waste** biodegradable waste is collected using dustbins placed in different parts.

Waste Paper : Biodegradable paper waste, which can be decomposed by biological processes, is called biodegradable waste. The waste paper is collected in the dust bins and disposed to scrap merchants on monthly basis. Two sided utilization of paper is done

**Present Status: Dust bins were provided for the waste disposal the same is collected daily once and handed over the Municipal corporation.**

2. **Non- Bio Waste** – Plastic Bottles /Sanitary Pads

Non- biodegradable waste, which cannot be decomposed by biological processes, is called non- biodegradable waste. These are of two types - Recyclable: waste having economic values but destined for disposal can be recovered and reused along with their energy value. e.g. Plastic, paper, old cloth etc. Non-recyclable: waste which do not have economic value of recovery. e.g. Carbon paper, thermo coal, tetra packs etc. Disposal of non-biodegradable waste is a major concern, not just plastic, a variety of waste being accumulated. There are a few ways to help non-biodegradable waste management. The impact of non- biodegradable waste on the environment and also focus on its safe disposal for sustainable environment.

**Present Status : The plastic bottles are collected in the dust bins and disposed to scrap merchant . The sanitary pads in the Girls Wash rooms are disposed with Incinerators .**

**Biomedical waste:** Microbial and pharmacological waste generated in the campus is Is sterilized in the autoclaving and packed in safety bags respectively.

3. **E Waste Management**

Waste Electrical and Electronic Equipment (WEEE) or E-waste is one of the fastest growing waste streams in the world. In developed countries, it equals 1% of total solid waste on an average. In developing countries, it ranges from 0.01% to 1% of the total municipal solid waste generation. In countries like China and India, though annual generation per capita is less than 1 kg, it is growing at an exponential pace.

**Present Status : The College is collecting the E waste and disposing once in a year basis to the E Waste disposing agencies , the agency will come and pick up the E waste and dispose it in environmental friendly way.**



Sri Gayatri Energy Services

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## Audit Framework and detailed findings of the Audit

Objective	Observation/ Present status	Remarks / Recommendation
Green Cover - Plantation of Trees	Plantation of trees is started in the campus and the green cover is extended every year in the campus. At Present 14.67 Acres campus is having the Green cover.	A Continual plantation of trees is going on. A total area of 14 Acres is having greenery.
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Water Conservation – i) Rain Water harvesting  ii) Eliminating Leaking Taps  iii) Avoid Misuse/wastage of water	<p>i) It is proposed to construct Rain water Harvesting pits</p> <p>ii) A Dedicated Team working on the repairing the leaking taps across the campus</p> <p>iii) RO Plant is installed for providing safe drinking water, which generates RO reject water, this water is used for Gardening.</p> <p>iv) Encourage to reduce the water usage by displaying mesaages</p> <p>v) It is recommended to install Water Sprinkler system installation is initiated to save water</p>	<p>They will be functional very shortly.</p> <p>Most of the taps are repaired, It is recommended to install taps with reduced water flow like shower / Mist.</p> <p>Reward the personnel informing Leaky taps, Paste Labels where ever water is expected to be wasted. Process initiated</p> <p>It is recommended to Install a Aqua Conditioner to reduce the RO Reject.</p> <p>Recommended to install Bio Toilets/Water Less Toilets like ECO Loo which reduces water usage and generates fertilizer from human waste and Natural liquid from the Urine which can be reused for gardening. Under process</p>



Waste Management		
i) Biodegradable Waste	i) The biodegradable waste is collected in bins placed in different parts of the campus ii) Paper Waste is disposed to scrap merchant	i) Compost pits and used as manure. ii) Handed over to municipality
ii) Non Bio Waste	i) Non Bio Waste – Plastic Bottles / Paper Waste Metals waste is being collected in the dust bins placed across the campus .A GWMC team is visiting the campus on weekly basis and collecting the same.	ii) It is proposed to install plastic bottle crusher, which can be sold as a feed stock for the Plastic industry. iii) Installed Sandy (Sanitary napkin crusher at ladies Toilet) to avoid choking of toilets and wastage of water.
iii) Bio Waste	i) Microbial media and pharmacological waste is sterilized with autoclaved and packed in safety bags and handed over to municipality.	
iv) E Waste	i) E Waste – All Electronic Junk is generated in the campus in the form of Used Computer key boards/ Mouses/ CPU's/ Damaged Printers etc is disposed to E Waste agency which collects and disposes in an environmental friendly manner.	iv) It is recommended to have an MOU with E Waste disposal agency on yearly basis.



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## Carbon Foot Print

Total students: 1472 / Faculty: 208 / Staff- 59 /Buses: 24(over all campus)

More precisely related to Jayamukhi College of pharmacy faculty: 42 /staff 13 /and 250 students

A detailed Carbon foot print calculation is presented in later chapters

Carbon Foot Print i) Transportation	i) Most staff commute in the College Transport - Buses from City ii) Students commute in the college provided transport - Buses	i) Adequate buses are available for the Staff /students.
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## References

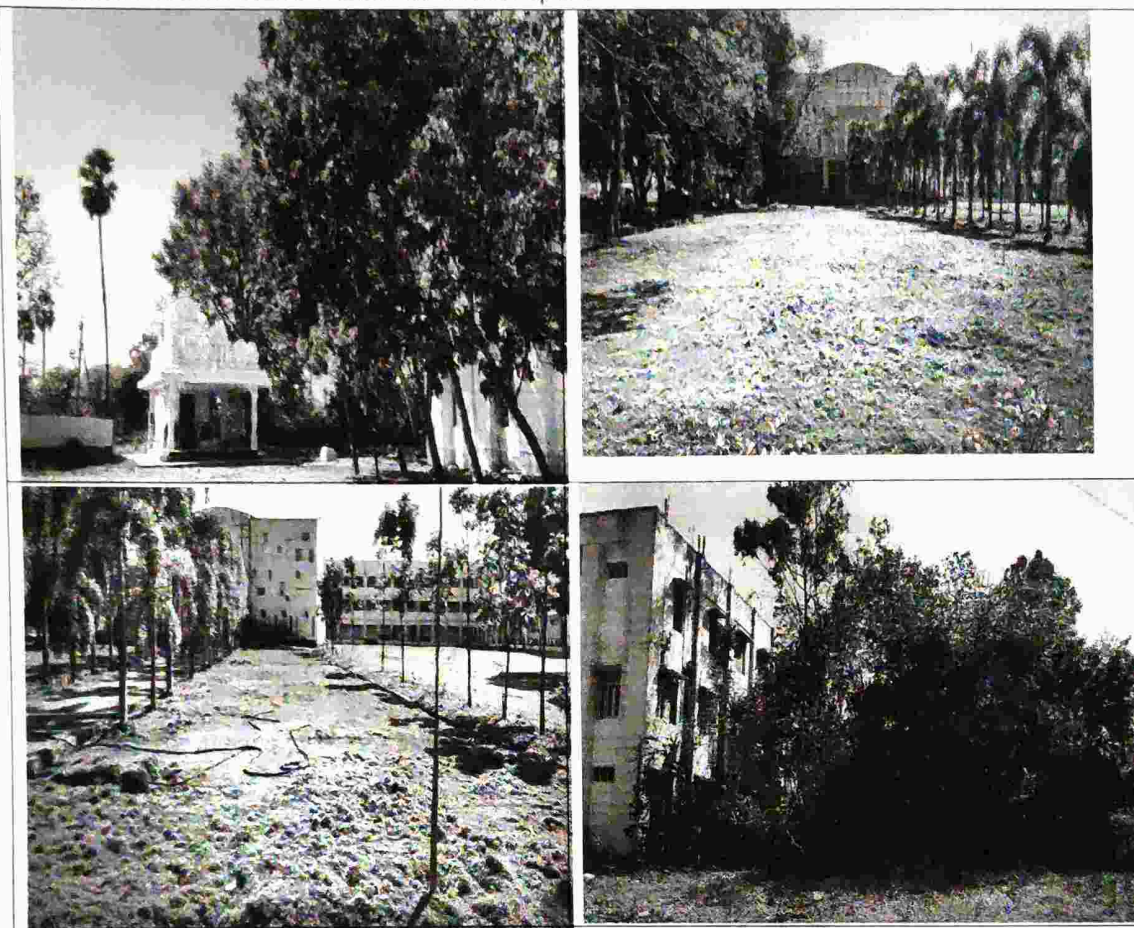
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## Visuals of Plantation of Trees across the campus

A Detailed Pictures are attached with this report



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Sri Gayatri Energy Services Hyderabad



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Waste Collections Bins



Paper Waste – Outdoor



Paper Waste – Indoor



Waste paper bin



Waste Bins



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Sanitary Pad Incinerator : It is proposed to install Sanitary pad Incinerator to dispose them in an environmentally friendly way.



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## E Waste management:

Policy: E-waste Management: Electronic equipment such as Computers, TV, Phones, Printers, Fax and Photocopy machines are recycled properly. Electronic goods are put to optimum use and the minor repairs are set right by the Laboratory Assistants; and the major repairs are taken up by the professional technicians and then reused. UPS Batteries are recharged and repaired by the suppliers. **Jayamukhi College of Pharmacy** zero waste management through recycle and up cycle. All electronic equipment used in the campus are regularly maintained and repaired to ensure minimum e - waste. Hazardous chemicals and radioactive waste management: Hazardous Chemicals are kept separately well labeled in the store room away from the reach of students. The hazardous chemical waste is properly treated before it is allowed to go into the drains. There is no use of any radioactive substance in the campus. Biomedical waste management: The institute is handling biomedical waste generated from microbiological and pharmacological labs by sterilized by autoclaving method and packed in safety bags respectively.

It is recommended to enter in to an agreement for disposal of the E Waste which are mentioned below with an agency

1. Electronic Waste (E-Waste) -The Term E-Waste will refer to the below mentioned electrical and electronic waste for the purpose of this Agreement which includes;
  - a) Computers & Peripherals (CPU, Keyboard, Mouse & Monitor)
  - b) Laptops
  - c) Servers
  - d) PCBs
  - e) Mobiles or Communication devices
  - f) Mother Boards (Computers & Laptops)
  - g) Security Devices
  - h) Telecom Equipment
  - i) Printers & Scanners
  - j) Military Electronic
  - k) Control Systems
  - l) Data Cables and wires
  - m) Batteries
  - n) CD/DVD
  - o) Tube lights and CFL



  
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## Carbon Foot Print

The Jayamukhi group of Institutes has total members – 1679 , Students – 1471 , staff -208 (

Teaching + NonTeaching- ) the Co2 emission is 6211 Kg/day

Members by Two Wheeler – 100 – Co2 emission are. 156.75 Kg

/dayMembers by College Bus – 1474 - Co2 emission is 6011 Kg/day

Members by Individual Car -4 – Co2 emission is 53.66 Kg/day

Note: Assume each member travel a distance of 25 kms to college and 25 kms return to home .

Mode of Transit	CO <sub>2</sub> released (per km driven per person)	CO <sub>2</sub> released during production of vehicle
Car	271 g	313 g
Bus	101 g	---
Bicycle	16 g (This is from the fuel of the rider – food)	16 g

	Pounds CO <sub>2</sub>	Kilograms CO <sub>2</sub>	Pounds CO <sub>2</sub>	Kilograms CO <sub>2</sub>
Carbon Dioxide (CO <sub>2</sub> ) Factors:	Per Unit of Volume or Mass	Volume or Mass	Million Btu	Million Btu
<b>FOR HOMES AND BUSINESSES</b>				
Propane	12.70/gallon	5.76/gallon	139.05	63.07
Butane	14.80/gallon	6.71/gallon	143.2	64.95
Butane/Propane Mix	13.70/gallon	6.21/gallon	141.12	64.01
Home Heating and Diesel Fuel (Distillate)	22.40/gallon	10.16/gallon	161.3	73.16
Kerosene	21.50/gallon	9.75/gallon	159.4	72.3
Coal (All types)	4,631.50/short ton	2,100.82/short ton	210.2	95.35
Natural Gas	117.10/thousand cubic feet	53.12/thousand cubic feet	117	53.07
Gasoline	19.60/gallon	8.89/gallon	157.2	71.3
Residual Heating Fuel (Businesses only)	26.00/gallon	11.79/gallon	173.7	78.79
<b>OTHER TRANSPORTATION FUELS</b>				
Jet Fuel	21.10/gallon	9.57/gallon	156.3	70.9
Aviation Gas	18.40/gallon	8.35/gallon	152.6	69.2
<b>INDUSTRIAL FUELS AND OTHERS NOT LISTED ABOVE</b>				
Flared natural gas	120.70/thousand cubic feet	54.75/thousand cubic feet	120.6	54.7
Petroleum coke	32.40/gallon	14.70/gallon	225.1	102.1
Other petroleum & miscellaneous	22.09/gallon	10.02/gallon	160.1	72.62
<b>NONFUEL USES</b>				
Asphalt and Road Oil	26.34/gallon	11.95/gallon	166.7	75.61

Sri Gayatri Energy Services

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Lubricants	23.62/gallon	10.72/gallon	163.6	74.21
Petrochemical Feedstocks	24.74/gallon	11.22/gallon	156.6	71.03
Special Naphthas (solvents)	20.05/gallon	9.10/gallon	160.5	72.8
Waxes	21.11/gallon	9.57/gallon	160.1	72.62
<b>COAL BY TYPE</b>				
Anthracite	5,685.00/short ton	2,578.68/short ton	228.6	103.7
Bituminous	4,931.30/short ton	2,236.80/short ton	205.7	93.3
Subbituminous	3,715.90/short ton	1,685.51/short ton	214.3	97.2
Lignite	2,791.60/short ton	1,266.25/short ton	215.4	97.7
Coke	6,239.68/short ton	2,830.27/short ton	251.6	114.12
<b>OTHER FUELS</b>				
Geothermal (average all generation)	NA	NA	16.99	7.71
Municipal Solid Waste	5,771.00/short ton	2,617.68/short ton	91.9	41.69
Tire-derived fuel	6,160.00/short ton	2,794.13/short ton	189.54	85.97
Waste oil	924.0/barrel	419.12/barrel	210	95.25
Source: U.S. Energy Information Administration estimates.				
Note: To convert to carbon equivalents multiply by 12/44. Coefficients may vary slightly with estimation method and across time.				
Carbon Dioxide Emissions Coefficients by Fuel				
Detailed factors (discontinued)				

**A Green Initiative : Bicycles are kept at the campus for commutation within the campus for the staff / students**



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