

SHRI R.L.T. COLLEGE OF SCIENCE, AKOLA

Facilities for alternate sources of energy and energy conservation measures

2022-23

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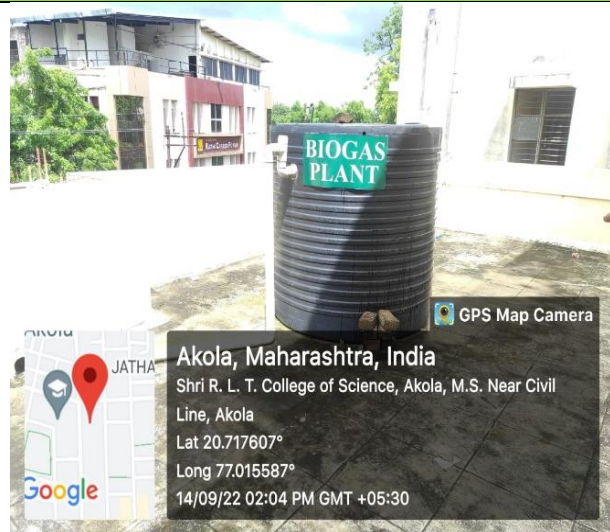
Shri R.L.T. College of Science, Akola has following facilities and initiatives for Alternate sources of energy conservation measures:

- i. Solar energy
- ii. Biogas plant
- iii. Sensor-based energy conservation- Water tank overflow alarm system installed at three places in college campus.
- iv. Use of LED bulbs/ power efficient equipment

Photographs-

Solar energy													
	<div style="background-color: #008000; color: white; padding: 5px; text-align: center;"> SOLAR ROOFTOP GRID - TIE SYSTEM (Renewable Source of energy) </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  </div> <div style="width: 50%;"> <ul style="list-style-type: none"> ▶ Shri R.L.T. College Premises is powered by environment friendly alternate source of energy i.e Solar Energy. ▶ Powering capacity of 30 kw is installed which reduces about 102 tonnes of CO₂ emissions per year and also reduces deforestation of 2,255 trees in a year. ▶ It is a clean and green source of energy for uses in the premises. ▶ Cost effective with reducing electricity bill. </div> </div> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <thead> <tr style="background-color: #008000; color: white;"> <th>Solar Rooftop Grid</th> <th>Per Day Generation of Electricity</th> <th>Monthly Generation of Electricity</th> <th>Yearly Generation of Electricity</th> </tr> </thead> <tbody> <tr style="background-color: #008000; color: white;"> <td>30 kw</td> <td>120 Units</td> <td>3600 Units</td> <td>43,200 Units</td> </tr> <tr style="background-color: #008000; color: white;"> <th>Saving Amount Approx. (Rs)</th> <td>1200 Rs.</td> <td>3600 Rs.</td> <td>4,32,000 Rs.</td> </tr> </tbody> </table>	Solar Rooftop Grid	Per Day Generation of Electricity	Monthly Generation of Electricity	Yearly Generation of Electricity	30 kw	120 Units	3600 Units	43,200 Units	Saving Amount Approx. (Rs)	1200 Rs.	3600 Rs.	4,32,000 Rs.
Solar Rooftop Grid	Per Day Generation of Electricity	Monthly Generation of Electricity	Yearly Generation of Electricity										
30 kw	120 Units	3600 Units	43,200 Units										
Saving Amount Approx. (Rs)	1200 Rs.	3600 Rs.	4,32,000 Rs.										
Solar panels of 18 kw and 12 kw on college main building													
													
Solar water heater in girl's hostel	Solar panels of solar based LED lights												

Biogas plant



Biogas plant in Girl's hostel

The Berar General Education society's
Shri. R. L. T. College of Science, Akola,
U. G. C. Women's Hostel

BIOGAS PRODUCTION FROM KITCHEN AND FOOD WASTES

Goal: The aim of the college is to solve the problem of waste disposal from kitchen and dining of girls hostel as well as garbage of college campus and to generate energy from waste.

Importance: A biodegradable waste fed biogas plant in college campus is a best eco friendly technology for the treatment of kitchen and dining waste. It also becomes an effective tool to solve the fuel supply needs of the hostel.

INTRODUCTION:

- Biogas is a non-polluting, eco-friendly fuel produced by the **anaerobic digestion** and its **bio-gas** meets about 70% of the rural energy needs.
- Biogas is produced by **anaerobic** action of various microbes through the bio-degradation of **organic material** under **anaerobic** conditions.
- Biogas produced from organic wastes and it usually contains 60 to 70% methane, 30 to 40% carbon dioxide and ~ 1% nitrogen (Das et al., 2007).

Mechanism of Biogas formation:

- In the first step, i.e. the hydrolysis, various hydrolytic bacteria e.g. *Bacteroides* sp., *Cellulomonas* sp. break down complex molecules like fats, proteins, etc. into simpler molecules like fatty acids, amino acids, etc.
- In the second stage, acetogenic bacteria e.g. *Acetivibrio* sp. decompose the remaining complex organic molecules into acetic acid.
- When acetic acid has been produced, methanogenic bacteria e.g. *Methanomonas* sp. and *Methanobacterium* sp. convert it into methane. This last step is called methane production or methanogenesis.
- The decomposed carbon is converted almost completely into methane. The product formed is the combustible biogas.

Instrumentation and setup of Biogas plant:

Substrate Loading Plan:

WATER: 50 litres	COOKING WASTE: 100 litres
Cooking Waste: 25 kg	100 kg vegetable waste in above tank

Biogas produced and utilized for cooking purpose.

COMPOSITION OF BIOGAS:

- CH₄ (60-70%)
- CO₂ (30-40%)
- H₂ (1-2%)
- N₂ (1-2%)
- H₂S (1-2%)
- Water vapour

SIGNIFICANCE OF BIOGAS:

- Environmentally friendly
- Reduces greenhouse gas emissions
- Helps in waste management
- Reduces dependence on fossil fuels
- Improves air quality
- Reduces pollution
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REFERENCES:

SANDEEP A. TOSHNIWAL
(Research Scholar, Department of Microbiology)

Chart of Biogas plant installed

Sensor-based energy conservation



Water tank overflow alarm system.mp4

<https://youtube.com/shorts/U3WMCAMt6tw>

Sensor-based energy conservation: Water tank overflow alarm system installed at three places in college campus.

Use of LED bulbs/ Power efficient equipment



Use of LED bulbs in Auditorium, office, many classrooms and laboratories

Power efficient equipment



Microwave Oven in Chemistry Laboratory.



Bacteriological Incubator in Microbiology Laboratory



Power saving refrigerators in various laboratories
