

Date : 12/06/2023

### 7.1.2 The Institution has facilities for alternate sources of energy and energy conservation

- Solar Energy
- Bio-Gas Plant
- Sensor-based energy conservation
- Use of LED bulbs/ power efficient equipment

#### About Solar Energy

1) Solar technologies convert sunlight into electrical energy either through photovoltaic (PV) panels or through mirrors that concentrate solar radiation. These solar panels, mounted on a rooftop, harvest solar energy and convert it to electricity. This energy can be used to generate electricity or be stored in batteries or thermal storage.

2) Solar energy power from the sun is a vast, inexhaustible, and clean resource. Sunlight, or solar energy, can be used directly for heating, lighting homes and businesses, for generating electricity, for hot water heating, solar cooling, and many other commercial and industrial uses.

3) Solar energy is the heat and light we get from the Sun, it is renewable, widely available and clean providing enough energy to meet the world's annual consumption needs.

#### Solar Power for Academic Institutions:

1. Solar Panels Work Well on Most University Roofs
2. Solar Power Can Reduce Operating Costs for the Institution
3. Solar Power Can Help Boost Enrolment
4. Solar Power Provides Unlimited and Reliable Energy



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## 5. Solar Arrays at Colleges Helps Drive Solar Power Forward



**Image showing solar power panel installed on top of roof**

Solar panels are installed on rooftops of the College building. They are a renewable energy source that doesn't create harmful greenhouse gas emissions.

Solar panels, also known as photovoltaic (PV) panels, work by converting sunlight into electricity through the use of PV cells

The alternating current can be used to power fed into the electric grid.

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## SOLAR PLANT ENERGY CHART

### Total Power Capacity

- Power from 181 panels of 315 W each:  
 $181 * 315 W = 57,015 W$  or  $57.015 kW$
- Power from 21 panels of 300 W each:  
 $21 * 300 W = 6,300 W$  or  $6.3 kW$
- Total Power Capacity:  
 $57.015 kW + 6.3 kW = 63.315 kW$

### Energy Production per day

- Since every day has about an average of 4 hours of sunlight:  
 $63.315 kW * 4 \text{ hours} = 253.26 kWh$  per day

  
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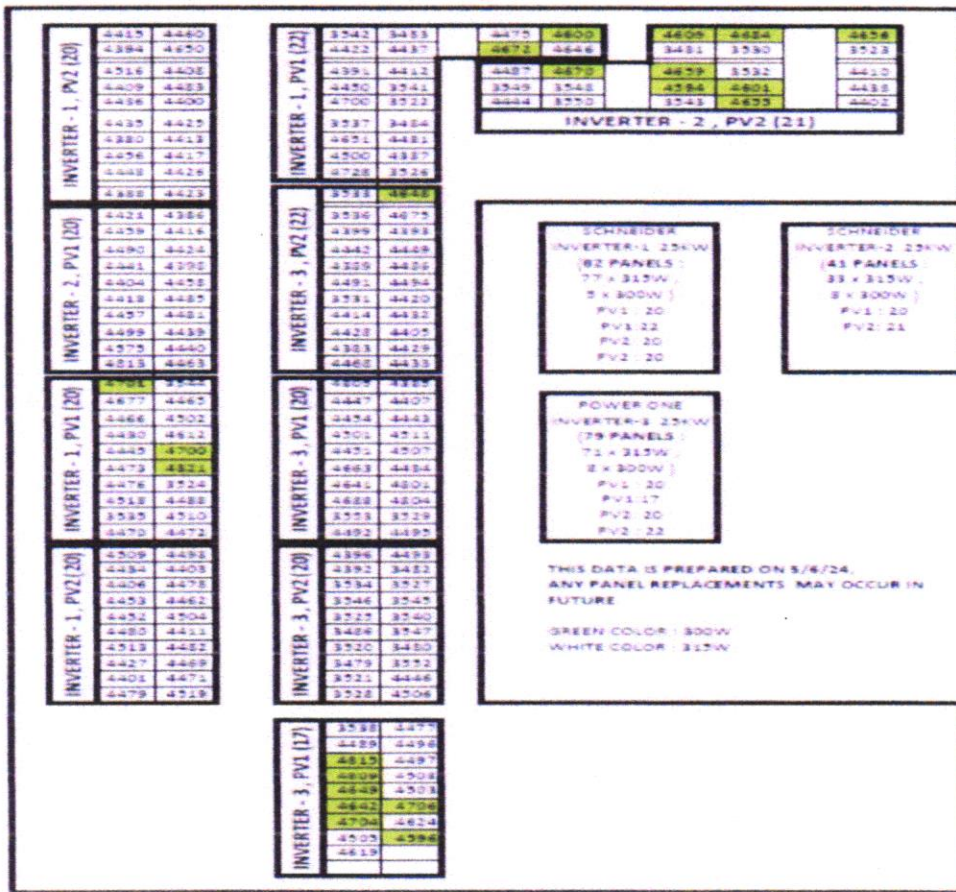
  
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- Daily Energy Production = Total Power Capacity Sun Hours Efficiency  
Using 70% efficiency (0.70):  
253.26 kWh \* 0.70 = 177.282 kWh per day

**Monthly Energy Production (for a 30-day month)**

- Monthly Energy Production  
= 177.282 kWh/day 30 days = 5318.46 kWh
- Electrical Energy 1 kWh = 1 Unit  
So, 5318.46 kWh = 5318.46 Units



Images Showing Solar Panel Numbers

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## Wheeling to GRID



Wheeling is the transportation of electrical energy from an electrical grid to another electrical load outside the grid boundaries.

We have the source of Electricity from GOVT board and SOLAR panel. Electricity from both the sources is stored and distributed from the wheeling to grid.

Wheeling to the grid is the process of transferring electricity from a generator to a consumer through the national grid. It's a useful way to transmit power from renewable energy sources, like solar or wind farms, to consumers in other locations.

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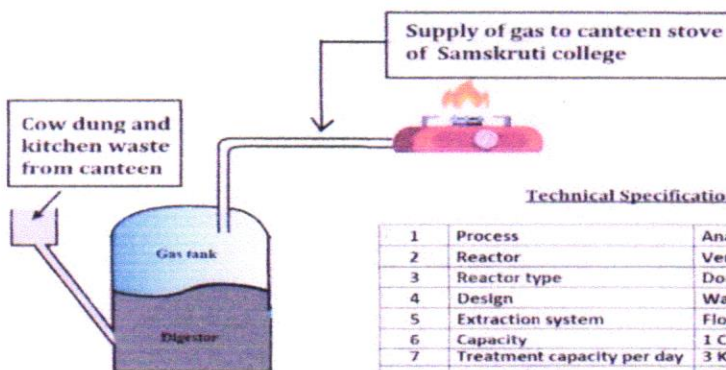
## Bio-Gas Plant

A biogas plant is a facility that provides oxygen-free conditions where anaerobic digestion can occur. Simply put, it's an artificial system where you can turn waste into sustainable energy and fertilizers, with positive effects on the environment.



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#### Bio Gas Plant Chart



#### Technical Specification of BioGas Plant

|    |                            |  |
|----|----------------------------|--|
| 1  | Process                    | Anaerobic digester                                 |
| 2  | Reactor                    | Vertical reactor portable made                     |
| 3  | Reactor type               | Double partitioned                                 |
| 4  | Design                     | Water sealed jacketed column                       |
| 5  | Extraction system          | Flooding type automatic with respect to fresh feed |
| 6  | Capacity                   | 1 Cum  |
| 7  | Treatment capacity per day | 3 Kg biowaste                                      |
| 8  | Gas production             | 500 grams of equivalent LPG gas                    |
| 9  | Structure                  | Digester above ground or partially below ground    |
| 10 | Holder movements           | Horizontal type                                    |
| 11 | Feed                       | Food waste   |

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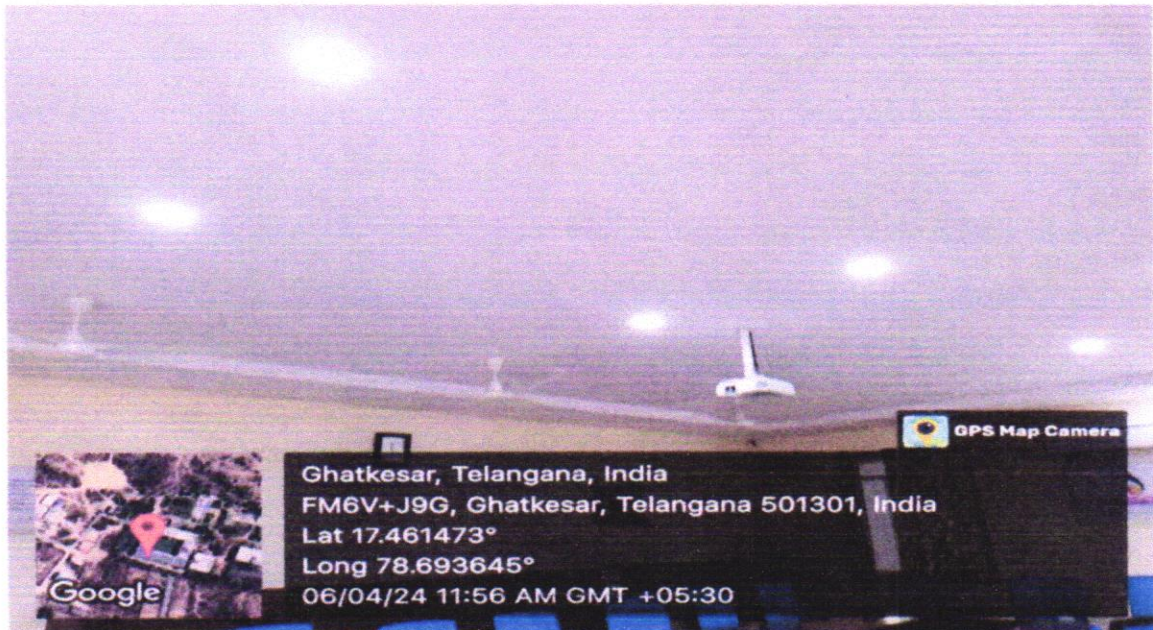
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### **Sensor-based energy conservation:**

Sensor based lights are used in Campus to add to already existing energy conservation methods. Sensor based lights save energy by automatically putting off the lights when not in use.

### **Use of LED bulbs/ power efficient equipment:**

LED Lights are energy efficient and they have long life span. They offer improved environment performance. They work at low voltages. LED provides instant light and they can withstand frequent switching. Apart from sensor-based LED lights, various colleges, departments at SNTWU, where renovation and repair work is carried out, and the old tube lights are replaced by LED lights



**LED lights and bulbs are used in Auditorium, Presentation room, Seminar Hall, Class rooms, Training & Placement cell.**

  
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