



Seval Education Society's
Seval Mahila Mahavidyalaya

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Criteria-VII
Institutional Values and Best Practices

REPORT
ON
NON-CONVENTIONAL ENERGY

Principal

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REPORT ON NON-CONVENTIONAL ENERGY

Renewable energy sources, often known as non-conventional energy, are sources that are renewed by natural processes continually. Solar energy, bio-energy (bio-fuels cultivated sustainably), and other sustainable energy sources are some examples.

A renewable energy system transforms energy from the sun, falling water, and biomass into heat or electricity that humans can utilize. The majority of renewable energy originates from the sun and wind, either directly or indirectly, and can never be depleted, which is why it is termed renewable.

However, traditional energy sources such as coal, oil, and natural gas provide the majority of the world's energy. Non-renewable energy sources are the word used to describe these fuels. Even though the accessible amount of these fuels is enormous, they are finite and will, in theory, run out at some point in the future.

With rising energy use, the population is becoming increasingly reliant on fossil fuels such as coal, oil, and gas. Because the prices of gas and oil continue to rise with each passing day, it is necessary to guarantee future energy supplies. As a result, we must employ more and more renewable energy sources.

UG, PG, and research students can help and comprehend the significance of natural resources like air, water, oil, and minerals that are depleting quickly. And how we can improve the situation by taking the necessary steps in our everyday life to preserve these resources.

In our college, we have instruments such as biogas plants, solar cookers, and solar photovoltaic systems that help the students in learning about the significance and usefulness of natural resources. They can use these types of equipment for dissertation and research work.

Non-conventional energy instruments are crucial because they teach students how to offer solutions to pressing environmental problems and understand the significance of natural resources. The aim should be to build a society where everyone is aware of environmental issues, cares about them, and tries to find long-term solutions to both the problems we are currently facing and those we hope to avoid in the future.



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Advantages of Non-conventional energy sources:

- They are renewable in nature.
- They produce little or no pollution as compared to traditional energy sources.
- They require little maintenance.
- They are a long-term cost-effective choice.

The following Non-conventional Sources of Energy in our institution and college hostel.

1. Solar cooker
2. Biogas plant
3. Solar Photovoltaic (PV)

Since prehistoric times, solar energy has been the most easily available and free source of energy. Every year, solar energy estimated to be equivalent to approximately 15,000 times the world's annual commercial energy consumption reaches the planet. For 300 to 330 days per year, **India receives solar energy in the range of 5 to 7 kWh/m²**. This energy is enough to run a 20-megawatt solar power plant per square kilometer of land.


“Longer-term benefits will come from the development of affordable, unlimited, and clean solar energy technologies,”. It boosts sustainability, decreases pollution, cut climate change mitigation costs, and keep fossil fuel prices lower than they would be otherwise. These benefits are widespread. As a result, Solar thermal devices are utilized in residential and industrial like solar water heaters, solar cookers.

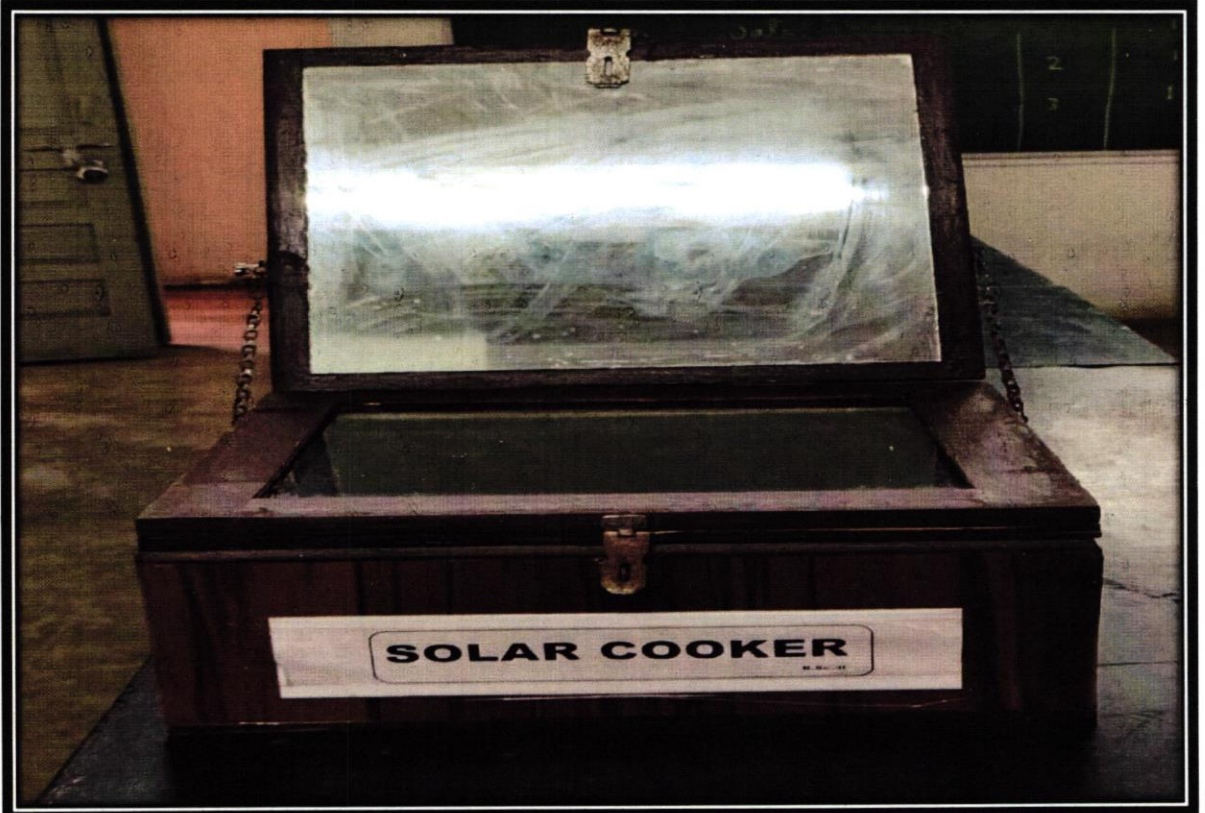
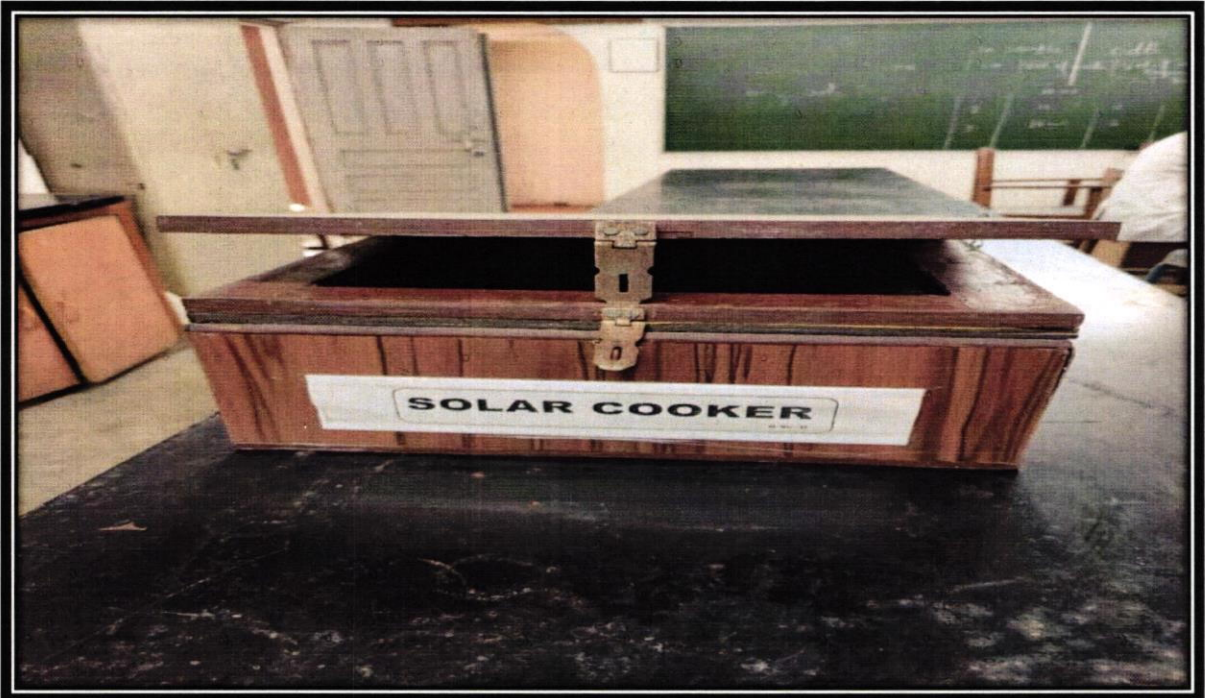
a) Solar cooker:

A solar cooker is a device that cooks using sun energy, reducing the need for fossil fuels, wood, and electricity to a considerable amount. It can only be used to augment cooking fuel. It is a basic cooking device that is suitable for home use throughout most of the year.

Solar cookers in a box: The box solar cookers with a single reflecting mirror are the most common. These cookers have become quite popular in rural regions where women spend a significant amount of time gathering firewood.




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Solar cooker

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b) Solar Photovoltaic (PV):

Using the photoelectric effect, a photovoltaic system transforms light into electrical direct current (DC). Solar PV has grown into a multibillion-dollar, fast-growing business that is continuing to increase its cost-effectiveness and, together with CSP, has the highest promise of any renewable technology. Lenses or mirrors, as well as tracking systems, are used in concentrated solar power (CSP) systems to focus a wide region of sunlight into a tiny beam.

The technical name for solar electric is photovoltaic. Photo is short for “light,” while voltaic is short for “electric.” PV cells are typically constructed of silicon, a material that releases electrons spontaneously when exposed to light. The number of electrons emitted by silicon cells is proportional to the amount of light shining on it. The silicon cell is encased in a metal grid that guides electrons along a route to produce an electric current. This current is directed into a wire that connects to a battery or a DC device. One cell typically produces 1.5 watts of electricity. Individual cells are linked to make a solar panel or module with a power output of 3 to 110 watts. Solar panels may be linked in series and parallel to form a solar array that can produce as much power as space allows. Modules are typically intended to provide 12 volts of power. The peak Watt production of PV modules is measured at solar noon on a clear day.



Solar PV system installed at college terrace

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c) Biogas:

It is also called sewer gas, compost gas, swamp gas and gobar gas. Biogas is a naturally occurring and renewable source of energy, resulting from the breakdown of organic matter. Biogas is a clean and efficient fuel made from cow dung, human waste, or any other biological substance that has been fermented anaerobically. The biogas contains 55-60% methane and the remainder is mostly carbon dioxide. Biogas is a non-toxic fuel that may be used for cooking and lighting. The by-product can be used as high-quality manure.

Biogas can be used for electricity production. It is produced from plant and animal waste it is good fuel and can be used as a replacement for LPG or Natural gas and can generate electricity. Biogas production can reduce the pollution potential because it is generated from waste. Today's big problem of nature is pollution, in our college we have portable biogas plant for UG and PG students for study purpose and awareness about protecting the environment by using waste material for generation of biogas and improving sanitary conditions in rural and urban areas.

Feed stock for biogas:

- Livestock manure.
- Food processing waste.
- Sewage sludge.

Working of Biogas plant-

- 1) Biogas is made in a digester which is a tank filled with bacteria that eat organic waste and give flammable gas (biogas).
- 2) The bacteria in the tank should be taken care of well and proper food is to be given.
- 3) The bacteria convert organic matter into methane gas through anaerobic respiration.
- 4) The operator of the biogas system feeds the digester with household by-products like kitchen waste, manure, etc.
- 5) The methane gas produced can be used for cooking, lighting, etc.
- 6) The waste which is fully digested will form an organic fertilizer. (1 kg cow dung produced – 0.5 m³ of biogas daily)
- 7) Its main part consists of:
 - a. Mixing tank
 - b. Digester



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- c. Outlet chamber
- d. Overflow tank

Composition of Biogas:

- Methane-50 -75%
- CO₂ – 25 – 50%
- Nitrogen – 2 – 8%
- Trace levels of H₂S.
- Volatile organic compound.

Benefits:

- Reduction in green gas emission (GGE).
- Sustainable alternative energy source.
- Ecofriendly and pollution free environment.
- It is low-cost energy source.
- Biogas generation reduces soil and water pollution
- Biogas generation produces organic fertilizer

Significance:

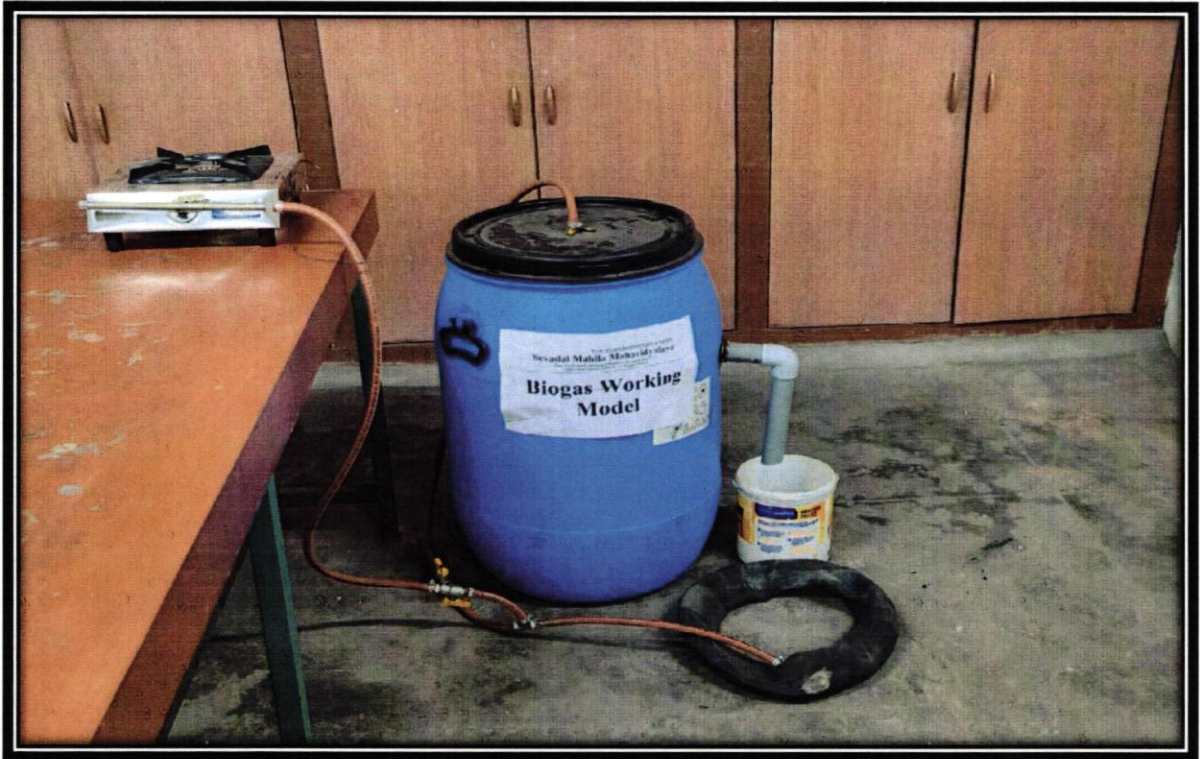
These instruments were available for students. They can take advantage of these instruments for study purpose in projects, research, and dissertation work. The students can take on new projects and which will be based on such types of instruments which will help them gain practical knowledge. The students can create awareness in the society by applying this equipment in rural and urban areas as role models. Choosing environmental studies as a subject helps the students to create a harmonious relationship with the environment and help in conservation of non-conventional energy resources.

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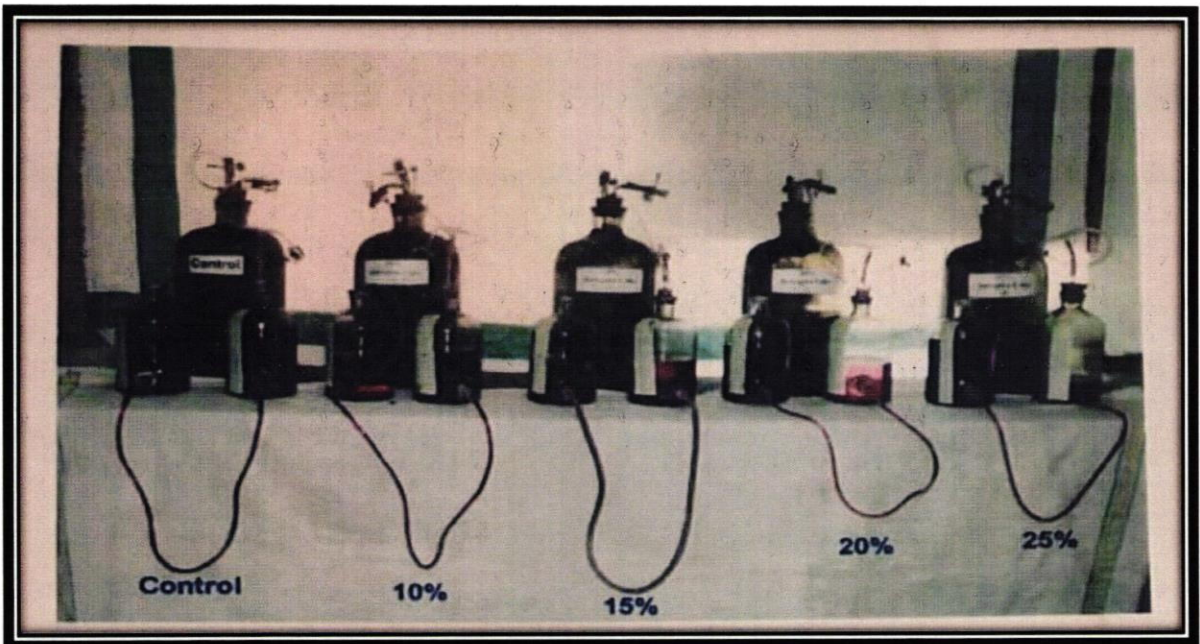


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Portable Biogas working model



Biogas digesters

BSG base
JSM




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