



Best Practice: 2

1. Title:

To setup energy efficient, pollution-free campus by utilizing Nonconventional energy sources.

2. Objectives of the Practice:

- To reduce dependency on fossil fuels for energy security and sustainability by utilizing solar and solar-wind hybrid energy for electrification of campus.
- To use solar water heaters for student's hostels
- To promote green and clean power to reduce the Carbon emission.
- To create pollution-free environment by treating sewage and tree plantation for green and clean Campus.
- To use canteen waste food, biomass for bio-gas plant and preparation of the compost

In overall, the aim is to prefer non-conventional energy sources in the campus and reduce carbon emission leading to pollution free and ecofriendly campus.

3. The Context

Presently, due to increasing cost of crude oils and scarcity of fossil fuels, nonconventional energy sources are preferred at all possible conditions. The nonconventional energy sources attracted since previous few decades as those are having added advantages. The pollution-free energy sources are the biggest advantage of using these sources. Previously, the electricity bill of around Rs. 14 Lakhs per year was main part of the institute's recurring expenditure. The canteen food waste and biomass management is another aspect of creating healthy environment in the campus. The sewage water disposal is also main concern. The idea of reduce, reuse and recycle is the key aspect for proper waste management. In order to set up energy efficient and pollution free campus, it was decided to leverage the nonconventional energy sources.

4. The Practice: Considering the importance of non-conventional energy sources and the need of satisfying increasing energy demand, the non-conventional energy sources are effectively utilized. The detailed procedures of survey, plan, procurement, installation, commissioning and regular maintenance for various plants have been setup. The use of non-conventional energy sources have been achieved through following plants.

4.1 Solar Energy:

a. Institute has installed 400 KW Solar Roof Top PV Plant as a clean energy project to make the campus eco-friendly. The project has been successfully installed and generating



power which is more than energy requirements of the campus. The surplus power of about 4 Lakh units is exported to Maharashtra State Electricity Distribution Corporation Ltd. (MSEDCL). Details of solar rooftop PV Plant are,

Installation cost (Rs)	= 1,48,25,000/-
Generated electricity	= 1511 Mwh
Saving (Rs)	= 2,06,25,000/-
CO2 Saving	= 1600 Tons/ year



b. Solar-Wind (Hybrid) energy:

5 KW Hybrid Solar Wind Energy System is installed successfully at roof top of main building and cost of the installation is Rs. 12 Lakhs. It is also used for practical demonstration to the students.

c. Solar Water Heaters for Hostels and other Utilization of solar energy:

- Using solar water heater at hostels. (capacity 41000 Litres per day)
- Use of Solar street lights in the campus

4.2 Solid Waste Management through Biogas used for cooking:

Solid waste collected from mess and canteens which is used for generation of biogas under the theme of “Reduce, Recycle and Reuse”. Daily 28.4 Kg of bio gas is produced and utilized in Annapurna Mess. Annually 3 tons of manure is generated through vermicomposting. The same is utilized for gardens in campus.

Solid Waste Management

Vermi-compost Plant



Bio waste dumped in this pit



Bio degraded waste is filled in container



Worms are added in degraded bio waste



Vermi-compost Plant

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4.3 Liquid Waste Management and saving carbon emissions:

Waste water generated from Amrutvahini Campus includes sewage from the educational buildings, boy's hostels, girl's hostel and staff quarters etc. It needs treatment before discharging it as effluent into natural stream/river etc. and same treated waste water can be utilized for various purposes like gardening and irrigation. To treat waste water, innovative 3E (Eco-friendly, Economical, and Efficient) microbial technology has adopted by the institute. In 2019, Sewage Treatment Plant (STP) having capacity of 0.4MLD is started.

Sewage Treatment Plant (Annualy)

Installation cost (Rs. In lakhs) = 35.5

Sewage Treatment Plant Capacity 0.4 Mld



4.4 Additional Measures for saving electricity:

- By using microprocessor based Automatic Power Factor Correction (APFC) bank for maintaining the supply P.F to 1.
- 500 KVA online tap changing transformer is used to maintain the voltage constant.
- Star rating equipment and machinery are preferred.
- Effective utilization of natural light in the building.
- Water supply in Sanstha premises through gravitational water flow.
- LED lamps and Electronic ballast are used to reduce energy consumption.

4.5 Participation for Awareness Program of Gandhi Global Solar Yatra:

The institute organized Students Solar Ambassador Workshop in association with IIT Bombay on 2nd October 2019, 150th Birth anniversary of Mahatma Gandhi where in 875 students and 40 trainers from institute participated which was Guinness World record event (Gandhi Global Solar Yatra). Trainers trained the students for assembling the solar-LED lamp unit and learnt practical skills.

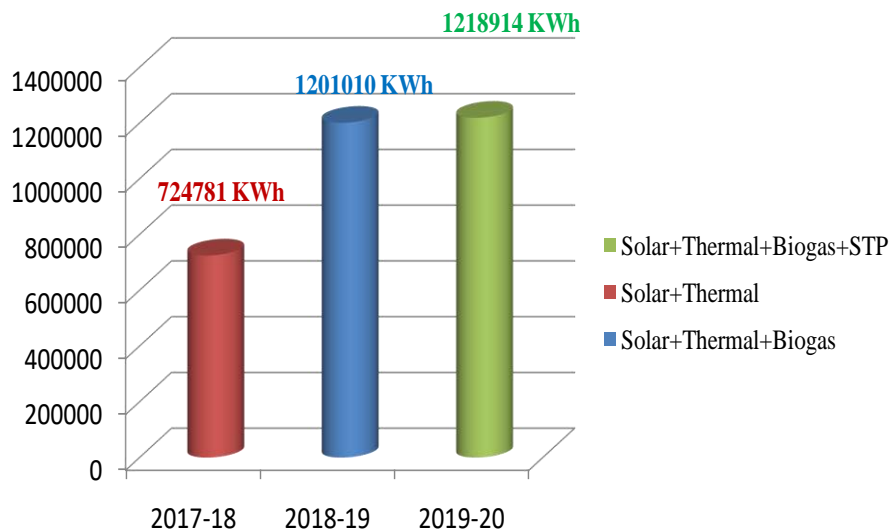


Student Solar Ambassadors Workshop Organized in Association with IIT Bombay

5. Evidence of Success:

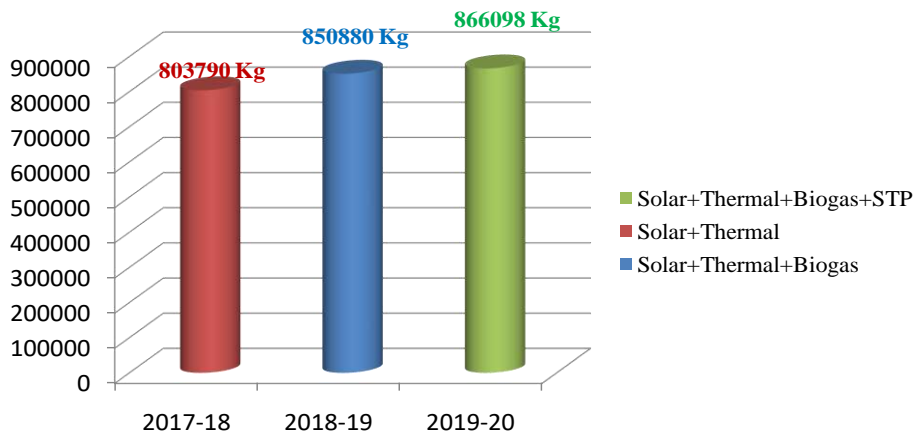
1. The institute has already recovered the installation cost of Solar Energy project, and more than 4.0 Lakh units are exported to MSEDCL.
2. Reduction in Energy Consumption as Reflected in Electricity bill.

Annual Energy Savings by Renewable Energy sources





Annual Saving in CO₂ Emission



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3. The institute is awarded as “Energy Efficient Unit” in 21st National Energy Award for Excellence in Energy Management organized by Confederation of Indian Industry (CII) in year 2019-20.
4. Received 12th State Level Energy Conservation Award of excellence in energy conservation and management by MEDA in year 2018-19.
5. Clean and Green Campus Award from AICTE, New Delhi in year 2019-20.

6. Problems Encountered and Resources Required

The economical and effective technologies were identified and finalized with the view of successful implementation and operation. The initial cost of all these systems is huge and requires proper justification. The in-house resources such as faculty members, civil and electrical maintenance department have contributed immensely for different activities like survey, planning, procurement, commissioning and installation. The regular operation and maintenance is looked after by deputed faculty members.

7. Notes (Optional)

The pre-sanctioned subsidy of Rs. 65.00 Lakh was received from Solar Energy Corporation of India Limited (SECI) for Solar Roof Top PV Plant. In addition, grant-in-aid of Rs. 5.0 Lakh received from Savitribai Phule Pune University, Pune under Quality Improvement Programme.