

Parvatibai Chowgule College of Arts and Science
Autonomous

7.1.2 Institution has facilities for alternate sources of energy and energy conservation measures

Additional information

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Installation of Solar panels and Solar Street lights

The Institution has taken measures to facilities for alternate sources of energy and energy conservation measures by the installation of solar panels on the rooftop of Block D and the illumination of the college entry point by solar street lights.

1. Installation of solar panels

The process involved the identification of a suitable shadow-free space on the roof top of D-block. Nine solar panels of each with maximum power of 330 watts were procured. Thus, total maximum power that could be generated is 2.97 kilowatts. The metallic frames were fabricated and fixed on the terrace on which the solar panels were installed. The inverter is installed on the adjacent wall near the roof-top which is used to convert DC voltage output to an AC voltage. The inverter output was wired to different installations by electrical cables. The load is distributed as follows:

D Block - Room Number	Entity	Quantity	Starting Load (watts)	Total load (watts)
D201	Tube light	4	36	144
	Ceiling fan	1	40	40
D202	Tube light	4	36	144
	Ceiling fan	1	40	40
D203	Tube light	4	36	144
	Ceiling fan	1	40	40
D204	Tube light	8	36	288
	Ceiling fan	2	40	80
D205	Tube light	12	36	432
	Ceiling fan	6	40	240
D207	Tube light	26	36	936
	Ceiling fan	5	40	200
			TOTAL	2728

Details

- Total Solar PV system size = 2.72 KW
- Sunshine period = 7 Hours
- Units generated = 19.04 kWh/day
- Average electricity cost = 6.05 Rs/kWh
- Daily cost saving = 115. 192 Rs/day
- Monthly cost saving = 3455.00 Rs/month
- Yearly cost saving = 41,460.00 Rs/month
- Solar PV system cost = Rs. 200000.00
- Payback period = 4.8 years
- The average life of Solar PV system is 15 – 20 years.

2. Installation of solar street lights

Objective is to illuminate the road from college main gate to gymnasium. For proper illumination, installation of the solar powered LED lights at every 10 meters was proposed. Accordingly, six poles were erected from college main gate to college office. Solar street light works on the principle of solar cells. Solar cell absorbs solar energy during the day. The solar cell then converts the solar energy into electrical energy which is stored in the battery. During night time street light starts automatically and consumes energy already stored in the battery. Solar street lights are composed of LED lights. LED lights are used since it works on small currents and hence smaller sized solar panels suffice the solar street lights with LEDs. These LEDs work on directly on DC current and hence there is no additional requirement of DC to AC converter unit.

Units composed of solar panels and LED bulbs were procured and assembled. Each unit is also fixed with motion sensors. During the night time if there is a motion near the solar street light as detected by the motion sensor and all LEDs glow 100%. If there is no motion only 33% of LEDs glow resulting in higher backups and energy savings. For effective functioning of the solar street lights, an array of LEDs bulb of 60 Watts giving light intensity of 30 to 40 lux in the vicinity of the electricity pole are installed.

Photographs



Shielding Arc welding of the frame



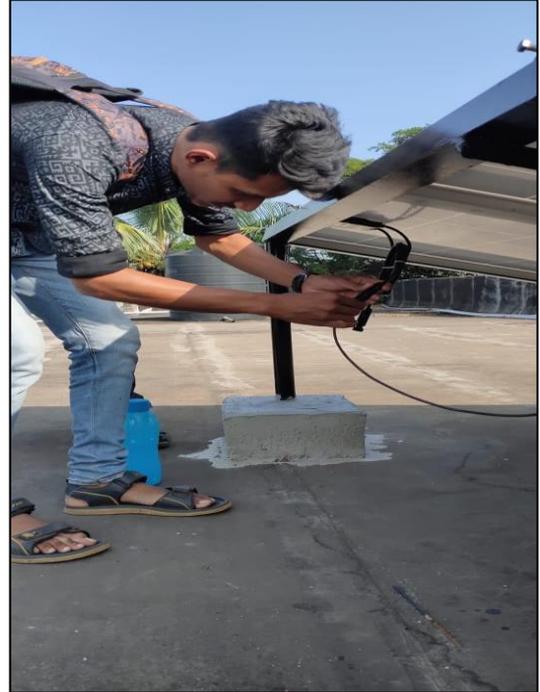
Stands used for supporting the solar panels



Mounting a solar panel



Mounted solar panels



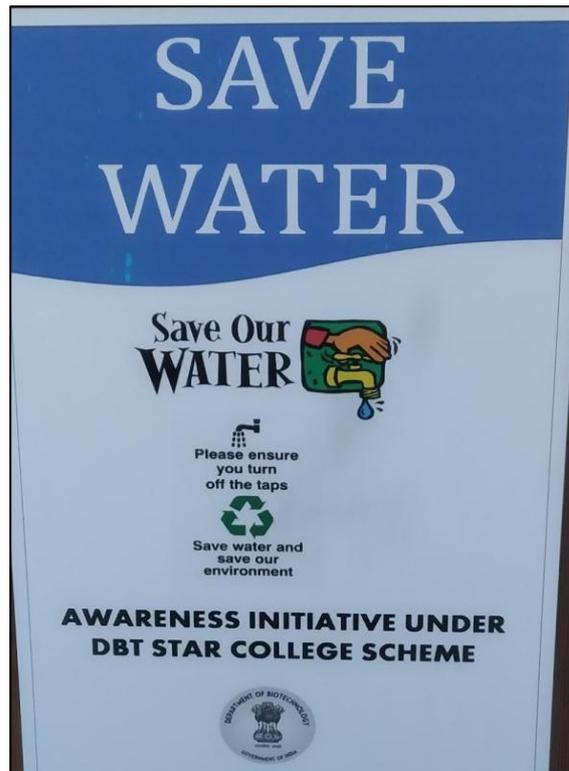
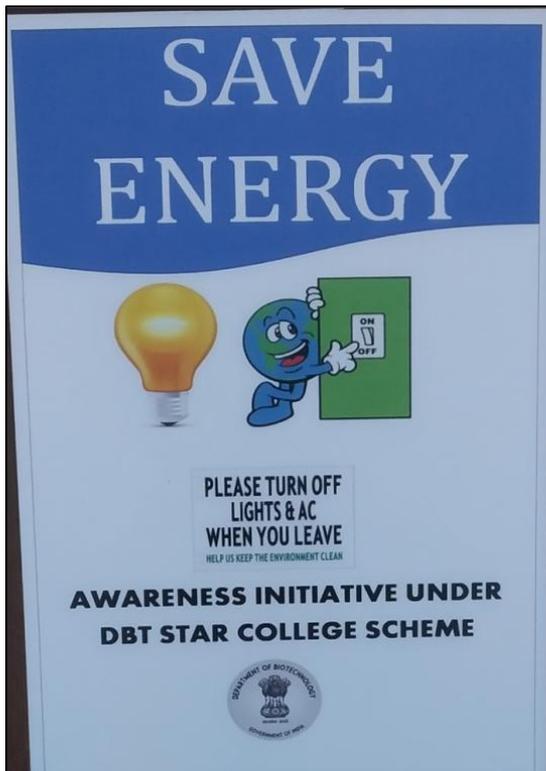
Connecting Solar panels in series



(L to R) AC Distribution box, solar inverter, DC distribution



Panel for solar street light mounted on the pole and its illumination during light



Save energy labels at various locations of the college