DEPARTMENT OF CIVIL ENGINEERING

TERI GRAM VISIT

TERI(The Energy & Resources Institute) visit was held on 27th September, 2016 at Gwal Pahari ,Gurgaon , Faridabad Road, Haryana. Event was coordinated by CRC department & Civil Engineering Department. 55 students including 4 faculties from the Civil Engineering Department and 1 from CRC Department participated in this technical visit.

Visit moments

Visit moments

Waste water treatment system

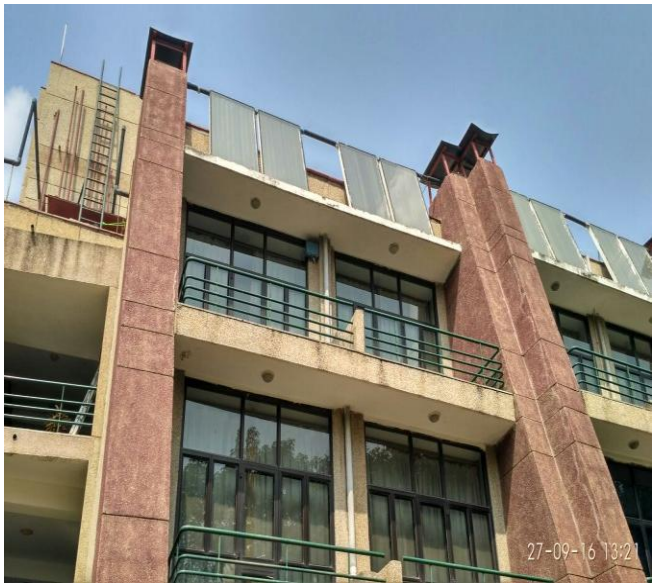
Biotechnology

Plants in Green House System

RETREAT, a model of sustainable habitat

The resource-efficient TERI retreat for environmental awareness and training

Renewable energy is seen as an effective option for ensuring access to modern energy services in our vast country. Local and regional environmental problems associated with the generation of conventional energy have provided a strong argument for enhancing the role of renewable energy within the broad energy development plans of the country.



With this in mind TERI developed this complex at Gual Pahari, Gurgaon, as an example of sustainable habitat.

The Gual Pahari campus is situated 35 km south of Delhi, at Gurgaon, Haryana, covering an area of 36.5 hectares of beautifully landscaped surroundings. When TERI bought the land, it was totally rocky and devoid of any vegetation. Intense plantation activities were undertaken by scientists and researchers for improving the fertility of the land and today it is covered with lush green forests and gardens full of beautiful flowers. Amidst this greenery and beauty lies the RETREAT -- for the resource-efficient TERI retreat for environmental awareness and training -- a model of sustainable habitat.

TERI has successfully built this habitat, which integrates various forms of renewable energy sources and is an ideal example for architects, builders, and others for the promotion of renewable energy technologies in the country.

This climate-responsive building is intended to serve as a model sustainable habitat, based on new and clean technologies. During construction the following points were kept in mind.

The sun is a clean, abundant, and free source of energy.

- Underground cellars are cooler in summer and warmer in winters.
- Deciduous trees shed their leaves in winter.
- Micro-organisms can feed on waste water and thus help purify it.

All this has been incorporated while building this resort and this has cut down the electricity requirements of the facility by about 60%. The technology employed at the facility, incorporates the following features.

- It is warm in winter and cool in summer.
- Well-lit all the year round.
- Set amidst a lush green landscape.
- Marginally dependent on grid-fed electricity.

Solar water heater

The RETREAT takes full advantage of the abundant solar energy and has used innovative ways to tap this energy by installing 24 solar water heaters to provide 2000 litres of hot water to the living quarters. Photovoltaic panels help capture solar energy and store it in a bank of batteries, which is the main source of power at night. Individual panels, power lights outside the building. Even the water pump is powered by solar panels.

South view of building showing solar water heating panels and solar chimney

The biomass gasifier is the main source of power during the day.

The biomass gasifier

During the day, the building is powered by a biomass gasifier, which is fed by firewood, twigs, branches, and crop stubble from the campus itself. In conventional devices that burn firewood directly, a large part of the energy is lost. In a biomass gasifier this wood is burnt twice as efficiently. Any surplus energy that is generated is used to recharge the battery bank. This battery bank is thus served by two sources of power, namely the photovoltaic panels and the gasifier.

The underground earth tunnels

The temperature in the living area is maintained at a comfortable 20° C to 30° C throughout the year, without the use of an air conditioner. The concept is based on the observation that underground cellars are naturally cooler in summers and warmer in winters. In ancient and medieval India, a similar concept was applied in the construction of buildings such as that seen in the Red Fort at Delhi. To circulate the air in the living area, each room has been fitted with a

‘solar chimney’ and the warm air rises and escapes through this chimney creating an air current. Cool air from the underground tunnels, helped by two blowers fitted in the tunnels, rush in to replace the warm air. In winter, the cold air in the rooms is replaced by warm air from the tunnels.

Waste-water recycling

At this complex, a novel method to recycle waste water for irrigation has been introduced. Sewage is collected in a settling tank and the sludge settles at the bottom and a part of the waste is decomposed at this stage by microbes. Next, the water passes through a bed of soil that also has some reeds that adapt well to water logged conditions. The roots of these plants act as a filter, removing and absorbing many of the toxic substances from the waste water. The water that comes out at this stage is of irrigation quality or even for bathing purposes.

Waste-water is recycled by the 'root zone' techniques, in which the roots of plants with special capabilities are used to clean the water which is used for irrigation purposes.

The complex has modern methods to harvest and store rainwater and ensures effective conservation of water. Efficient flushing systems, aerated taps that deliver water at pre set rates, a centralized laundry and other amenities are also provided.

A great deal of thought and planning has gone into the construction of this complex at Gual Pahari. It is a concrete reaffirmation of TERI’s faith in its research and of its commitment to sustainable development.

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