

Higher energy efficiency design features in existing and new buildings

Construction during 2021

Existence of plans

Shoolini University has already identified and planned to upgrade existing buildings to higher energy efficient buildings. The following designs had already been planned and their status 2021 is given as follows:

1. Design & Construction of 5 Solar huts using traditional materials (Status: **Completed**)
2. Design of International Hostel with Energy Efficient features (Status: **Completed**)
3. Redesigned and constructed Boys Hostel building for improving Insulation for thermal comfort (Status: **Completed**)
4. Retrofitting of Academic offices for thermal comfort improvement during summers & winters (Status: **To be implemented**)
5. Design & construction of Energy efficient Yogananda Meditation Centre (Status: **To be implemented**)
6. Retrofitting of Staff Residences for improving thermal comfort with space heating and ventilation systems (Status: **In progress**)

Energy Efficiency Measures continued: Undertaken during 2021

1) Boys Hostel Building

Under the energy efficient building policy, the University has already redesigned and constructed Boys Hostel building in the campus during 2021. Additionally, the new construction has composite wall of Cement block & Brick wall for improving insulation for energy efficiency and thermal comfort. Training to engineers, masons were provided in the construction of Rat trap wall with air cavity with insulation to promote energy efficient buildings in the university campus as shown in following figures.

Photos During Construction:





Figure 1: Training to Masons in Air gap brick walls and composite block walls being used for improving insulation and thermal comfort.

Photo :After construction:



Figure 2: Completed New Boys Hostel Building with Energy Efficient features

2) Construction of guest houses using traditional energy efficient materials



Figure 3: Sustainable Guest house building at Yogananda Ville



Figure 4: Traditional use of bamboo for improved insulation and thermal comfort in huts at Yogananda Ville



Figure 5: Sustainable hut near academic blocks

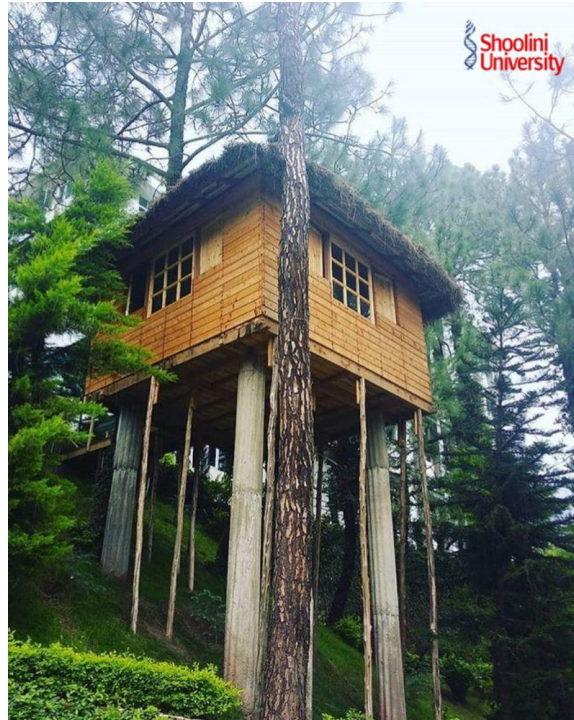


Figure 6: Building with Nature: One of the sustainable tree houses in the campus

3) Design of International Hostel with Energy Efficient features and Energy systems

Energy efficient Heat Pump has been installed for supplying hot water



Figure 7:Energy efficient heat-pump based water heating system has been installed in the international hostel Shoolini University



Figure 8: Energy efficient PTC Air heaters have been installed all international hostel rooms

- 4) New Buildings using energy efficient measures like ‘Rat Trap’ Builds i.e. cavity induced in wall which provides the advantage of thermal comfort. Makes the interior cooler in summer and warmer in winter**



Figure 9: Walls with Rat traps for better insulation and thermal comfort

- 5) Use of Autoclaved Aerated Concrete (AAC) Blocks leading to higher energy efficiency, 25% reduction in air conditioning costs. Thermal efficiency - 3 times higher than clay bricks. Sound insulation = 42 db.



Figure 10: Walls using AAC blocks for better insulation and energy efficiency



Figure 11: Use of large windows for increased solar gain and increased use of natural lighting.

- 6) **90% of lights in the university are LED based 20-Watt tube light which saves up to 50% energy. Rechargeable 18W LED lights have also been used. Replacement with energy efficient systems continues.**



Figure 12: LED lights are being used in almost all buildings in the university

- 7) **Additional New Solar Street Lights introduced**



Figure 13: One of the LED street lights within the university campus