ENERGY POLICY

Shoolini University

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shooliniuniversity.com/center-of-excellence-in-energy-science-and-technology

Energy Policy of Shoolini University

I. Purpose

Shoolini University is committed to United Nations Sustainable Development Goals (SDG) through its energy policy which makes it sustainable, energy efficient green campus.
This energy policy applies to all operations and activities of the University including building construction and renovation, transportation, and other operations in Environment, Water management and various activities undertaken by the University.

II. Policy Objectives

- To improve thermal comfort, energy efficiency, water conservation and to reduce energy consumption in all the new buildings at Shoolini University which are to be designed and constructed as per the solar passive building technology and other energy efficient and environment-friendly measures.
- To install solar roof-top systems for renewable energy generation.
- To install LED bulbs and other energy-saving devices in the campus.
- To install solar water heating systems in all the residential and hostel areas of the University.
- To install solar cooking systems in all the hostel areas of the University wherever possible.
- To reduce CO_2 emission generated by all means.
- To provide opportunities for students and employees to engage in initiatives which contribute to energy savings.
- To promote waste to energy generation.
- To ensure access to affordable, reliable, sustainable energy.to all.

III. Applicability

This policy shall apply to all departments/extensions of Shoolini University and villages around the campus as well as students, employees, faculty who'd be encouraged to take initiatives for fulfilment of the policy objectives.

IV. Policy on Energy Efficient Passive Solar Buildings for Zero Carbon Emission

1. Background

Under UN Sustainable Development Goal No.7 on Energy & 13 Climate Change decreasing the rate of increase in the concentration of atmospheric CO_2 can be achieved through reducing use of fossil fuels for removing CO_2 in building sector which consumes about 40% of the energy.

Creating carbon zero and carbon positive buildings cost effectively takes carefully planned application including affordability, Passive solar heating, Passive cooling, and Energy efficient Hot water systems; Heating and cooling; Renewable energy; Smart meters, etc.

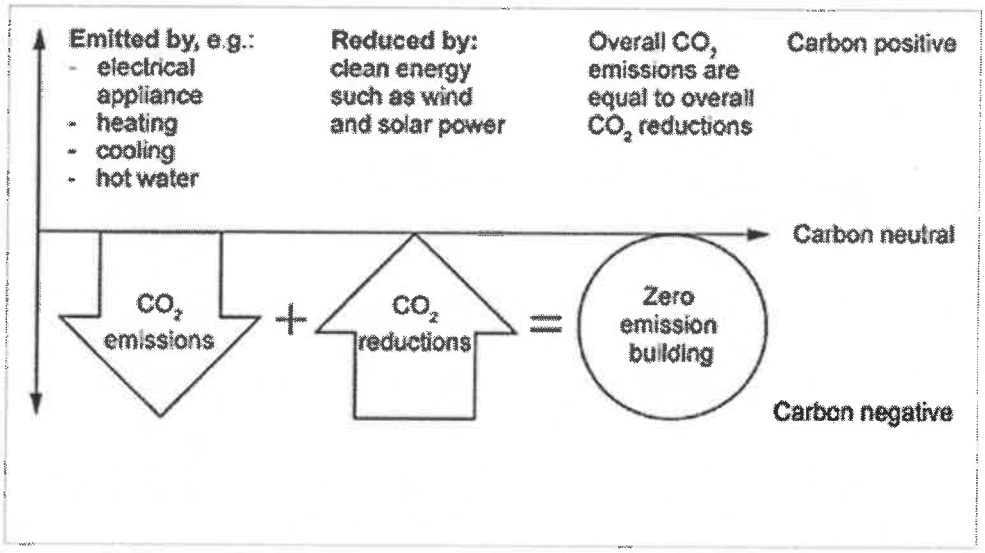

Fig. 1 Creating zero carbon and carbon positive buildings

2. Overall approach to carbon neutrality in buildings

Zero carbon buildings are defined as having no net annual emissions from direct fuel combustion (e.g., burning natural gas) and electricity use from operation of building incorporated services.

- Building incorporated services include all energy demands or sources that are part of the building fabric at the time of delivery, such as the thermal envelope (and associated heating and cooling demand), water heater, built-in cooking appliances, fixed lighting, shared infra structure and renewable energy generation.
- Zero carbon buildings must meet specified standards for energy efficiency and on-site generation.

Carbon positive moves beyond zero carbon by making or 'net export' contributions by producing more energy on site than the building requires and feeding it back to the grid (Net Metering PV Concept).

Carbon positive projects can make significant contributions by helping to address the carbon intensity and damaging impacts of past building practices and lifestyles, and by offsetting situations where carbon zero homes are not possible.

While zero carbon is considered to be today's benchmark of best practice, carbon positive buildings will play an increasingly important role in the future to limit global warming.

3. Policy Statement, Strategy & Guidelines

A) Policy Statement

Shoolini University makes it mandatory to design and construct all the buildings in its campus as per passive solar architecture and incorporating energy efficient building technologies according to the Solar House Action Plan & Policy of the State of Himachal Pradesh.

The feasibility of existing buildings for retrofitting of Passive Solar features/systems for improving energy efficiency and reducing energy consumption will be explored for urgent follow up action.

B) Co-ordination & Implementation Guidelines

a. The Centre of Excellence in Energy Science & Technology (CEEST) at the Shoolini University will co-ordinate the Solar Building Action Plan for Shoolini University.

b. A technical Project Management Cell (TPMC) has been established in the CEEST with Director (Energy) as the Principal Coordinator along with expert team in solar building design, renewable technology analysis, Director (Estate) & building maintenance In charge with concerned architect, civil/electrical engineer team for the construction . implementation and maintenance.

c. A Computer Aided Solar Passive Design Cell with architect, design engineer [structural], executive engineer, a Computer programmer well versed in building design software, Autocad, seismic analysis software, along with Solar radiation data & building performance monitoring, forecasting load analysis using Artificial Intelligence techniques will be established.

d. The constructed buildings will be live laboratories for energy education, research and development for CEEST.

e. Systematic efforts will be made by CEEST to orient & train University's technical. architecture and engineering sections for adopting the innovative technologies.

f. The CEEST will also promote the technology around nearby villages to help design their houses as social obligation to the communities along with providing technology inputs for the State of Himachal Pradesh Housing Agencies for effective implementation & Policy formulation.

C) Strategy

- Zero carbon buildings require that all carbon emissions be offset by passive solar design of buildings, reduction in conventional electricity consumption through on-site renewable energy generation by installation of rooftop solar or other renewable energy systems, as well as energy generation from waste.
- Incorporating energy efficiency strategies with renewable energy options
- Choosing a site that allows for renewable energy generation, passive solar heating and cooling
- Maximizing passive design strategies in the design of the building to reduce energy demand
- Reducing water use - particularly hot water -adopting Rainwater harvesting
- Identifying appropriate materials that enhance the passive design strategy and have a low embodied energy.

D) Guidelines

Maximizing energy efficiency significantly reduces the amount of renewable energy required to meet the energy needs without carbon emissions. This improves viability at three levels:

Physical — reduces roof surface area requirements for PV and other renewable energy systems

Economic — needs a smaller capacity system.

Environmental — uses few resources to manufacture system components.

V. Review

The Energy policy will be reviewed from time to time and updated whenever required.

Status of Policy Implementation Till Date

To achieve the objectives of the Policy, the University has already taken the following initiatives:

Initiatives already taken under the Policy

Energy Saving: Energy conservation was at the heart of planning the construction of buildings. Nestled in the green and salubrious clime of pine forests, the buildings have been constructed allowing maximum light and air circulation in all rooms and halls, thereby saving on electricity consumption, There is a major endeavor at Shoolini University to conserve energy and promote the usage of alternate sources. Actions taken in this direction have helped in making the campus green, energy efficient and energy surplus. Apart from the measures described below, there are buildings like the Yogananda Knowledge Center (Central Library) that need only the natural light during the day.

The faculty, employees and students lead initiatives to save significant electricity and have developed a policy for reducing electricity consumption by using LED and replacing the old tube lights with LEDs. All the computer monitors have been replaced with LED/LCDs displays. Replacement of old appliances like lights, fans with energy-efficient appliances is underway.

- **Green Energy Campus:** Under the Ministry of New & Renewable Energy, Govt of India, the Campus of Shoolini University is a Green Campus with Solar Energy utilization & environmentally friendly technology use. Research Center in Renewable Energy is specially formed to undertake research in this area and 24 nos of patents have already been filed through the same.

- **Solar Energy** is harnessed through Solar Photo Voltaic panels installed on the rooftops of most of the University building blocks and covered common areas exposed to sunlight, like the car park, part of the internal road etc, converting sunlight into electric energy. The University campus is connected to the State electricity grid through a grid interactive system. This solar power plant is generating electricity approximately in the range of 1400-1600 unit per day. This electricity so generated is used primarily is transferred to the grid sub-station.

- **Solar Steam Generating Cooking Systems (Scheffler Type) in Girls Hostel of Shoolini University**: A solar steam generating system based on Concentrated Solar Technology Solar radiation falling onto the dish is concentrated onto the receiver, which heats the water which is converted into steam to cook food for 500 students.

- **Solar Water Heating Systems for hostels:** Flat Plate Collector and evacuated Tube collectors are installed in all hostels of the University to provide hot water for about 3000 students.

- **Wheeling to the Grid,** transportation of the electricity generated by solar PV system to the power grid is accomplished over transmission lines. Time-of-use meters have been

installed to recover the wheeling costs. The system moves the least-cost power to where it is needed, thereby maximizing efficiencies. Excess electricity generated through PV process gets transferred to the grid through the wheeling system. Shoolini University has installed a 400kWp grid-connected solar power system of which meets the partial electricity needs of University.

- **Sensor-Based energy Conservation** is being practiced. Most streetlights in the campus have photocell controllers, which switch the light on and off at the right natural light level, normally near dusk and dawn. They have time delays and hysteresis to prevent change-over too quickly. There is a plan to convert to 100% sensor-based street lighting/ outdoor lighting system to prevent wastage of electricity.
- **Use of LED Lighting:** University campus is totally on LED lighting system, far more efficient than incandescent light bulbs or compact fluorescent lighting (CFL).

Registrar