03 GREEN BUILDINGS FOR COMPOSITE CLIMATIC ZONE-

INDIRA PARYAVARAN BHAWAN: DELHI

Project Highlights

- India's first energy-positive government building- integrates both energy efficiency and on-site renewable energy generation.
- Highest green- rated building: LEED platinum and GRIHA 5-Star
- 70% less energy use compared to conventional buildings with an Energy Performance Index of 44 kWh/m^2/year

Background

This is a project of Ministry of Environment and Forests for Construction of New office Building at Aliganj, Jor Bagh Road, New Delhi. The Building was planned to be a state-of-the-art landmark building, with emphasis on conservation of natural areas and trees to reduce adverse environmental impact. Being the highest green rated building in the country, the project serves as a shining example of high performing government buildings.

New Delhi

Building Use
Office Building
Climatic Zone
Composite

(Not to scale)

Project Objectives

I. Managed to achieve the reduction in embodied energy of construction and further reduction in the operational energy through the choice of sustainable natural construction materials
II. Managed to minimize the contribution towards Urban Heat Island effects through passive design features and sustainable site practices
III. Successfully utilized the Adaptive Thermal Comfort model and demonstrated innovative passive cooling technologies like geo-thermal cooling of condenser water to minimize cooling load
IV. Onsite rooftop solar power has been used for meeting the operational energy demands of the building

Project Approach

- Building Integrated Photovoltaic (BIPV) system has been integrated for power generation from solar panels
- Building is north-south oriented, with separate blocks connected through corridors and a huge central courtyard
- More than 50% area outside the building is covered with vegetation
- 75% of building floor space is day lit, thus reducing dependence on artificial lighting
- Central courtyard helps in air movement as natural ventilation happens due to stack effect. Additionally, windows and jaalis add to cross ventilation
- Energy efficient lighting system (Lighting Power Density = 5 W/m^2)
- High efficiency glass, high Visual Light Transmittance (VLT), low Solar Heat Gain Constant & Low U-value, optimized by appropriate shading
- 160 Tonnes of Refrigerant of AC load of the building is met through chilled beam system. Chilled beam are used from second to sixth floor. This reduces energy use by 50 % compared to a conventional system

- Variable Frequency Drives (VFDs) are provided in chilled water pumping system, cooling tower fans and AHUs
- Fresh supply air is pre-cooled from toilet exhaust air through sensible & latent heat energy recovery wheel
- Building Management System (BMS) has been integrated to monitor and control all building systems
- Solar PV system of 930 kW has been integrated to generate 300 kWh/day to meet the operational electricity demand of the building

Achievements

- The project has received GRIHA 5 Star and LEED Platinum
- The building has already won awards such as GRIHA 5-star of MNRE for exemplary demonstration of Integration of Renewable Energy Technologies

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Long term impacts

- The green building design strategies will help to maximize energy savings and minimize the operational cost of the buildings
- The green cover within the building premises will help to reduce the negative impacts of Urban Heat Island effects
- Water efficient design strategies will help not to impact the water resources of the locality in a negative manner

Source: As received from WRI

For more Information

https://cpwd.gov.in/CPWDNationBuilding/InaugurationPM25.02.2014/architectural_design.pdf
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