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Sustainable Skylines: A Study Of Green Building Initiatives In PCMC

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Abstract

"The greatest threat to our planet is the belief that someone else will save it." Well said by Robert Swa. This research paper focuses on this belief that we need to pay attention towards green initiative for environment conservation and energy efficiency as it is very essential for earth for long term sustainability. PCMC (Pimpri Chinchwad Municipal Co-orporation) has planned to spend Rs. 5000 crores on Green projects. One of Greenest and first in India Corporate Campus in World is Suzlon One earth situated in Magarpatta road, Hadapsar, Pune. This Campus is completely relying on renewable energy sources, utilizing a combination of hybrid wind turbines, solar panels, and photovoltaic cells for power generation. This studies depicts importance of green building initiative and by 2025, the majority of residential areas in PCMC are expected to transition into self-sustaining real estate developments. The PCNTDA (Pimpri Chinchwad New Town Development Authority) has outlined a structured, forward-thinking, and eco-conscious approach to real estate development in PCMC.

Keyword: Green Building, Sustainability, Environmental Conservation, Energy Efficiency, Renewal Energy Source.

Introduction:

The Pimpri Chinchwad Municipal Corporation is carefully pursuing its objective of offering cleaner and more environmentally friendly residences to its residents. Presently, there are approximately 60 green buildings either finished or in progress within the PCMC area. The newly constructed PCNTDA building plays pivotal role of the city's increasing emphasis on sustainable development. With this concern, Environmental conservation and energy efficiency are playing pivotal in Human health and well-being as its Preserving natural habitats and reducing pollution can help prevent diseases, improve respiratory health, and enhance overall human well-being. There are key features and principles of green building include the utilization of energy efficient technologies, careful selection of materials at the time of construction, conservation of water, reduction of waste and thoughtful planning of land use and site development. Some of the benefits of a green design to a building owner, user, and the society are specified by GRIHA(Green rating for Integrated Habitat Assessment) as a whole are Reduced energy consumption without sacrificing the comfort levels, Reduced destruction of natural areas, habitats, and biodiversity, and reduced soil loss from erosion etc. ,Reduced air and

water pollution (with direct health benefits) ,Reduced water consumption, Limited waste generation due to recycling and reuse , Reduced pollution loads, Increased user productivity, Enhanced image and marketability

Objectives of the Study:

1. To understand the concept of green building in construction sector,
2. To understand the importance of green building initiatives in Pimpri Chinchwad.
3. To analysis the green building initiative adopted by construction projects in Pimpri Chinchwad,
4. To suggest ways to create awareness about the green building initiative among developers, owners and occupants.

Concept of Green Building:

As per ICMA (International City /Country management Association) defines the term Green Building as Integrated approach to designing and building Cost-effective, energy, efficient, healthy and Eco-friendly living and working environment.

This concept is not concern only with the designing a building but it relates with entire life cycle of building in terms of its design, construction, operation, demolition, renovation and its maintenance. Green building is also called as Sustainable building or high performance building because its main objective is sustainability.

Green Building is the Practice of creating structures and using processes that are environmentally responsible and resource efficient throughout a buildings life cycle from sitting to design, construction, operation, maintenance, renovation and deconstruction.

Green building initiative mainly essential to reduce the overall impact built environment on human health and natural environment by efficient use of available resources like water, energy and other resources, reduction in waste and pollution with minimum environmental degradation.
They are some green building initiatives:
1. Energy efficiency strategies and technologies
2. Water Conservation
3. Material selection
4. Waste Management
5. Indoor environmental Quality
6. Site planning and optimum use of land
7. Sustainable operations and maintenance using green cleaning practices.

Research Methodology:

Top 10 construction companies in PCMC are considered for this studies. This research paper is collected through secondary data with supporting articles, websites, reports by developers, architectures and PCMC in terms of building construction.
The purpose of the article is to establish the features of the secondary data analyses in educational research and how it is presented in scientific articles of authoritative journals, conference proceeding and program courses for PhD students.

Importance of Green Building Initiatives:
Green building initiative in PCMC area created a classic shape to city skylines with an iconic building design corporate headquarters which resulted into a paradigm shift towards sustainable urban development. There are benefits with green building initiative like positive environmental footprint, Economic benefits, social benefits, Cityscapes transformation, heath facility to occupants. Green building projects also tends to fetch higher market values in real estate. Due to awareness for environment, regulatory compliance need to adopt by construction sector. Green building Initiative encourages stakeholders change mindset as embrace sustainability rather a transformative business culture. This becomes an influential factor to create high market demand by occupants for eco- friendly and health conscious living spaces in PCMC area.

Analysis of Green Building initiative:
Amongst Top 10 Construction companies, Godrej Properties Ltd and K Raheja has rated their projects for green building initiative in their residential building type which is prominently making PCMC more productive and competitive in Construction sector. Under performance based awards received by MEDA under project the Art Office building and Campus for MEDA, Aundh, Pune which is remarkable for Pune in Green Building Initiative in 2023.
Some of the Green building initiatives taken by following Construction companies in PCMC.

Godrej Properties Offers Services in Green Buildings:

1. Net Zero energy homes: By utilizing natural lights and employing energy efficient appliances.
2. Renewable energy sources: It involves the use of Solar panels, Wind turbines, Geothermal system
3. Intelligent Energy management: It includes Smart meters, real time track system of energy usages.
4. Innovative construction Material: It includes High Performance Insulation, Low emissivity windows and reflective roofs coatings which maintain comfortable indoor temperature.
5. Financial and environmental Benefits which makes long term savings and reduction in carbon emissions.
6. Water Conservation: Godrej properties use key strategies with water efficient fixtures, rain water harvesting, proper maintenance of faucets and efficient outdoor watering system.
7. Resilient Building material: By using natural resources in Construction Bamboo, reclaiming woods, rammed earth construction, fly ash concrete, innovative building technologies, climate responsive designs to mitigate flood and hurricane resistant glass.

Mechanical Services:
1. Air conditioning (Cooling / Heating / Humidity Control)
2. Ventilation System (Natural / Mechanical / Combination)
3. Staircase Pressurization
4. Building Management System

Electrical Services:
1. HT / LT Power Distribution
2. Lighting & Raw Power Design
3. Public Address / Audio Visual System
4. Security & Access System
5. Building Management System
6. Fire Alarm System

Infrastructure Electrical Requirements:
1. Sub-Station
2. Captive Power Generation
3. Street Lighting
4. HT / LT Cabling
5. Tele-Communication & Net Work System

Plumbing Health Engineering:
1. Internal & External Plumbing
2. Infrastructure / Public Utilities
3. Rainwater Harvesting / Drainage System
4. STP / UG Tank / OH Tank System
5. Fire Fighting System (Hydrants, Sprinklers & Fire Pumps)

Fire Safety & Security:
1. Fire Fighting Solutions
2. Fire Alarm System
3. Security & Access System
4. CCTV & PA system

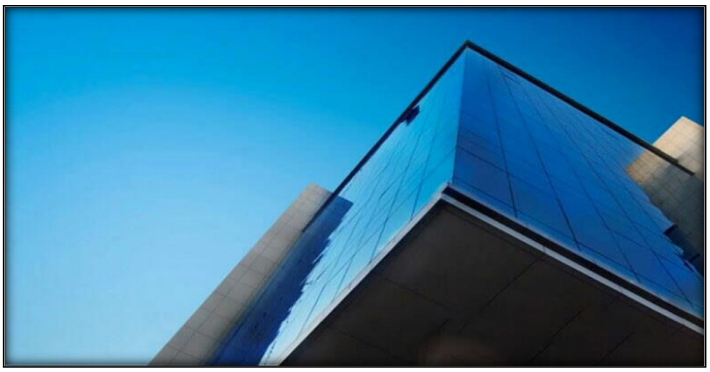
K Raheja Corporation Offers Services in Green Buildings:

1. Net Zero Concept Buildings
(Zero Energy and Zero Water Concepts)
The advancement of Net Zero Concepts hinges on utilizing renewable sources to generate as much energy as they consume. Buildings that produce surplus energy are termed 'energy-plus buildings,' while those consuming slightly more energy than they produce are known as 'near-zero energy buildings,' with energy measurement spanning a year. One notable aspect is their independence from external sources for energy and water, achieved through technologies like solar panels and wind turbines. The long-term advantages of energy conservation make it an attractive investment for companies.

2. Renewable Energy Through Solar PV Panels
Solar photovoltaic (PV) modules harness sunlight to generate electricity, contributing directly to a building's main power source. By reducing reliance on fossil fuel-based generation, the expanding grid-connected solar PV industry significantly aids in curbing greenhouse gas emissions. This form of power generation is inherently clean and free from pollution.

3. Dry Waste Composting
The composting plant reduces waste in an environmentally sound fashion. Aerobic conditions control the dry and wet waste composting process of biological decomposition of organic waste by bacteria, fungi, and other organisms. It provides a natural way of recycling waste to produce valuable organic fertilizer. Furthermore, the efficient composting system can produce high-quality soil amendment and has a long list of options for end uses.

4. Glazing
Glazing is another strategy to minimize heat in a building by deploying Low ‘e’ double glazed glass. These window frames contribute to a more pleasant interior environment, lower energy costs, and a brighter, cleaner, and healthier environment.



5. Replanting
Replanting is replacing trees and other greenery that may have been lost during construction to reduce the project’s environmental impact. By soaking up the undesirable polluting effects from the air, replanting has a significant noteworthy positive impact on the residents’ quality of life.

6. Low–Emitting Materials
It's critical to use low-embodied-energy local and recycled materials. Low-VOC paints, adhesives, and sealants are better for the environment and indoor air quality and are advised for use around people with environmental sensitivities when used in smaller amounts or not at all.

7. Organic Farming
The highly effective soil amendment generated by the Dry Waste Composting plant enables the Organic Farm to grow. The farm grows a wide range of small plants and trees that contribute to the overall project's aesthetic.

8. Led Lights in Common Areas
The genuine saviors in the field of energy efficiency are light-emitting diodes or LEDs. Lighting accounts for a significant portion of total electricity usage. LED lights have several advantages over traditional incandescent and CFL lamps, including lower power consumption, high efficiency, and long life. They deliver maximum luminaires, i.e., more light for less power. K Raheja Corp installed LED lights in all shared spaces of Mind space campus projects, such as landscape, lift lobbies, street lights, and entrance lobbies, among other things.

9. Sewage Treatment
The process of erasing pollutants from wastewater, mainly sewage, is known as sewage treatment. To remove these residues and produce environmentally safe treated wastewater, it uses physical, chemical, and biological processes. This treated water can be used for flushing, gardening, and HVAC technologies. As a result, the demand for municipal potable water will be reduced. Sewage treatment plants with high-class technologies such as MBBR and SAFF have been installed in all individual buildings on the Mind space campus.

10. Integrated Building Management System (IBMS)
IBMS automates the unified control of a building's heating, ventilation, air conditioning, lighting, and other systems. Building automation focuses on improving security, occupant comfort, building system efficiency, energy consumption, and operating costs, as well as prolonging the life expectancy of utilities. IBMS from international brands and benchmarks such as Siemens, Honeywell, and Trane have been installed in all Mind space buildings to improve building competently.

11. Rainwater Harvesting
Collection and storage of rainwater into natural reservoirs or tanks or the infiltration of surface water into subsurface aquifers by recharging pits is done by rainwater harvesting. Geological strata say all the buildings of Mind space, rainwater harvesting in terms of either tank or recharge pits have been engaged. Landscaping & flushing is done using rainwater.

12. Cooling Towers and Heat Recovery Wheels – Terrace
Cooling towers that are CTI certified and consume less energy, as well as heat recovery wheels that use waste heat to pre-cool air, ease the workload on the HVAC system, and save energy.

13. Water Efficiency
HVAC (Heating, Ventilation, and Air Conditioning) are features that distinguish today's modern constructions from modern homes and buildings. Air that has been warmed, cooled, or dehumidified passes through a series of ducts and is distributed throughout the house. A core HVAC system is the most productive and quiet way to cool up an entire home. Water-cooled screw chillers with a high coefficient of performance and environmentally friendly refrigerants should be used in HVAC systems. Controlling variable air volumes at designated areas and AHUs, cooling towers, pumps, and jet fans with variable frequency drives are monitored by a consolidated IBMS. Heat Recovery Units are linked to AHUs to minimize the chiller's cooling capacity. A Demand Control Ventilation system with CO2 sensors is required for improved IAQ. The main goal is to reduce the building's electricity usage from the power network, which is influenced by fossil fuel-based thermal power and thus contributes to lower pollution emissions, including GHG emissions. Many users are turning to daylight and occupancy sensors for common area lighting, as well as LED lighting for energy conservation.

14. HVAC and Electrical (Heating, Ventilation, And Air Conditioning)
Significantly larger conservation and water recycling attempts should be aligned with efforts to increase water capacity. Low-flow facilities, sewage treatment via recycled water reuse for flushing and landscaping, and decent drip and high-efficiency sprinkler irrigation must be addressed. Technological advances in green

building concepts help end-users save money on energy and water bills and help developers establish a reputable corporate image. The Indian government is providing special incentives, such as fast-track approval for green building projects, which will undoubtedly assist developers in starting and finishing projects on time.

Findings of the Studies:

As per report given by GRIHA, they have been more than 3500 registered projects across the country having 630 million square feet with combined footprint. Out of 3500, 700 buildings have been rated under which 533 MWP of renewal energy system installed which are resulted into saving in 2,97,38,818 mwh of energy and prevented to emit 83,93,046 tons of Carbon Dioxide into the atmosphere every year. GRIHA projects have contributed to Water savings of 10, 36, 11,250 kl/annum. Tree plantation have been done of more than 2,66,770 (new plants) and 28000 trees have been preserved.
Total Project under Maharashtra state registered is 1622 with various rating under Green Rating for Integrated Habitant Assessment. GRIHA mainly rated residential, commercial and Institutional projects under Maharashtra. Mahindra Group, K Raheja Group and Godrej properties are constriction companies which initiated towards rating in terms of green building in PCMC area.
Construction sector in PCMC is still not accepted this concept as it's still a niche segment. Developers, Owners, occupants have considered it as a separate category of projects rather it is being the standard now a day. It is essential to create awareness about green building initiative and try to avoid some wrong notions regarding the green building like projects are higher costs, more paperwork, legal compliance that means extra efforts for everyone in market. For achievement of sustainability, everyone has to take decision with long term perspective and rights efforts needs to be applied in terms of accepting new trends in market which create earth safe to live.

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