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Role of Green Architecture in Sustainable Development

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ABSTRACT: Green architecture aims at having buildings and their environs with high level of resource efficiency. This is achieved by using energy- efficient materials and construction techniques, harvesting and recycling of water and positive use of natural elements like air and light. We should follow the Green architecture concepts, which aim to examine critically the ways in which the resources including energy are used and to evolve measures for environment- friendly planning, design and construction of buildings and their surroundings. More energy use does not improve well-being. "According to some estimates, buildings account for almost one-half of the world's material and energy consumption, one-sixth of fresh water use, and a quarter of all wood harvested. So it has become necessary to follow sustainable concepts to get the rid from energy crisis". Green Buildings always offer a high comfort level and healthy indoor climate while banking on regenerative energies and resources that allow for energy and operating costs to be kept as low as possible. The main aim of sustainable development for builders, architects, designers, community planners, and real estate developers is to create buildings and communities that will not deplete natural resources. The goal is to meet today's needs using renewable resources so that the needs of future generations can be easily provided.

I. INTRODUCTION

India is in energy transition [1], ranking highest in energy consumption in residential buildings amongst all the Asia Pacific Partnership (APP) countries [2]. About 45% of the energy consumed in Indian residential buildings is used for providing thermal comfort indoors. This is a substantial quantum of energy for India, given the population of the country. Enormous use of ground for various purposes has lead to disappearance of green planted surfaces. In order to prevent dangerous and uncomfortable urban heat island effects the indispensable need of planted surfaces is must. Space constraints have further reduced the applicability of green surfaces in various areas surrounding the building envelope. Consequently, planted roofs become the one of promising and stabilizing choice in the present scenario. Good thermal protection can greatly reduce the high thermal loads that badly affect the comfort conditioning of building during summers.

The Motivation behind the Green Building Idea: Man's strive for increased comfort and financial independence, the densification of congested urban areas, a strong increase in traffic levels and the growing electric smog problem due to new communication technologies all cause ever rising stress levels in the immediate vicinity of the individual. Quality of life is being hampered and there are negative health effects. All this, coupled with frequent news about the global climate change, gradually leads to a change of thought throughout society.

II. GREEN ARCHITECTURE

Green architecture, or green design, is an approach to building that minimizes harmful effects on human health and the environment. The "green" architect or designer attempts to safeguard air, water, and earth by choosing eco-friendly building materials and construction practices.

Green architecture may have many of these characteristics:

- Ventilation systems designed for efficient heating and cooling
- Energy-efficient lighting and appliances
- Water-saving plumbing fixtures
- Landscapes planned to maximize passive solar energy
- Minimal harm to the natural habitat
- Alternate power sources such as solar power or wind power
- Non-synthetic, non-toxic materials
- Locally-obtained woods and stone

- Responsibly-harvested woods
- Adaptive reuse of older buildings
- Use of recycled architectural salvage
- Efficient use of space

While most green buildings do not have all of these features, the highest goal of green architecture is to be fully sustainable.

III. WHAT IS "SUSTAINABLE DEVELOPMENT"?

"Sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs." (World Commission on Environment and Development).

Sustainable development attempts to minimize greenhouse gases, reduce global warming, preserve environmental resources, and provide communities that allow people to reach their fullest potentials.

Sustainable development will have many, although not necessarily all, of these characteristics:

- Green architecture and eco-friendly building practices
- Local building materials
- Natural, bio-degradable building materials
- Local workers
- Renewable sources for water
- Renewable energy sources such as solar and wind
- Protection of natural habitats
- Planned replacement for any resources used
- Non-polluting construction practices and industries
- Walkable communities
- Mixed-use communities that combine residential and commercial activities
- New Urbanism
- Adaptive reuse of older buildings
- Use of recycled architectural salvage

IV. STRATEGIES FOR SUSTAINABILITY

Integrating Landscape and Architecture to make cities delightful. The more livable our cities, the more sustainable they can be.

Conserve Energy

- Cities: Reduce automobile use, Build compact cities, Public transit, pedestrian environment.
- Buildings: Insulation, orientation, passive and active solar energy. Day lighting. Shading, Sustainable sources of materials.

Reduce Heat Island effect

- Bring landscape into city for shade, air quality and delight. Plant trees for shade, green roofs, green corridors, reduce paving.

Reduce Pollution

- Recycle. Control sources for pollution, Regulate emissions, find alternatives to polluting substances.

Conserve Water

- Return rainwater to ground (permeable paving). Native landscaping requires less irrigation. Reuse gray water. Treat sewage to high degree.

Conserve Wildlife

- Protect wildlife habitat. Habitat corridors through city. Design habitats for native wildlife (parks for animals and people).

Examples: Integration of Landscape and Architecture to make cities Sustainable.

Here are immediate opportunities in this most unhospitable carspace:

- Blue = Rooftop available for solar panels or green roof.
- Light Green = Grass area available for wildlife habitat: Native shrub planting
- Dark Green = Parking areas available for shade trees in strips of permeable paving

Fig. 1. Concrete Plant (Barcelona,1973) which is reused into Offices (Ricardo Biofil Taller de Arquitectura, 1975).

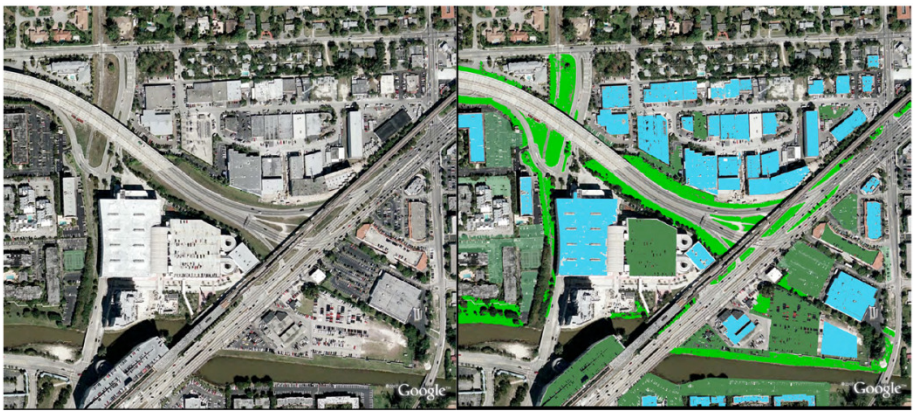

Fig. 2. Concrete Interaction of the US1 and the Snapper Creek Expressway in South Miami.

V. CONCLUSION

Build to save energy- stop global warming with earth-friendly, energy-efficient design.

- Build a Solar House
- Add Solar Panels to Your Old House
- Build a Geodesic Dome (Made with corrugated metal or fiberglass & these domes are inexpensive).
- Build a Monolithic Dome (Constructed of concrete and steel rebar, Monolithic Domes can survive tornadoes, hurricanes, earthquakes, fire, and insects).
- Build a Modular Home (Factory-made home that is fine-tuned to minimize power consumption. using pre-cut factory-made parts reduces environmental impact during the construction process).
- Build a Smaller House (Choosing compact, comfortable houses are less expensive to heat and cool).
- Build with Earth(Homes made from earth have provided inexpensive, durable, eco-friendly shelter since ancient times. After all, dirt is free and will provide easy, natural insulation).
- Imitate Nature (The most energy-efficient houses function like living things. They are designed to capitalize on the local environment and to respond to the climate. Made from simple materials found locally, these homes blend into the landscape. Ventilation systems open and close like petals and leaves, minimizing the need for air conditioning).
- Remodel to Save Energy (You don't have to build a whole new house to reduce your impact on the environment. Adding insulation, repairing windows, and even hanging thermal drapes can yield surprising savings. Even changing lightbulbs and replacing showerheads will help. Consider using eco-friendly paints and cleaning agents).
- Maximize the Renewable Energy (RE) use (Set up policies that favour RE as the first option whenever a new building should be built).

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