Green Residential Buildings-Integrated Design Strategies To Meet Regulatory, Lifestyle And Social Requirements

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Abstract - Green building is an efficient way of enhancing the environment. It benefits humans, the community, the environment, and a builder's bottom line in a variety of ways. It is about constructing a building and its site to adapt to the local climate, site conditions, culture and community, in order to reduce resource consumption while enhancing quality of life. In contrast to conventional buildings, green buildings seek to use land and energy efficiently, conserve water and other resources, improve indoor and outdoor air quality, and increase the use of recycled and renewable materials. While green buildings still constitute a tiny subset of existing buildings, their numbers are increasing rapidly.

Keywords- green building, conventional building, eco-friendly.

1 INTRODUCTION

The conventional building buildings use energy inefficiently, generate large amounts of waste in their construction and operation, and emit large quantities of pollutants and greenhouse gases. Due to the aforesaid reasons the beginning of the twenty-first century has ushered in the era of green buildings. Green building or sustainable design and construction provide an opportunity to use available resources more efficiently, while creating healthier and more energy-efficient homes and commercial buildings. Successful green buildings leave a lighter footprint on the environment through conservation of resources, while at the same time balancing energy-efficient, cost-effective, low-maintenance products for construction needs. In other words, green-building design involves finding the delicate balance between homebuilding and a sustainable environment. Sustainable term refers to the meeting the needs of the present without compromising the ability of future generations to meet their own needs.

The benefits of green buildings are financial, social and environmental. Financial benefits include reduced capital costs, lower operating and maintenance costs, reduced risks and liabilities. Social benefits include stronger social networks increased environmental awareness and environmental benefits include less impact on the natural environment healthy environments and improved productivity.

Green buildings are preferred over the traditional buildings because it reduces the adverse impact on the environment due to varieties of environmental unfriendly products used in the construction of traditional buildings. Due to the toxic chemicals present in the building products, furnishings and goods the indoor air quality gets deteriorated and causes various diseases like asthma, pneumonia etc. Thus, green buildings are the safest home to live in, affordable to operate and less damaging to local, regional and global environments.

Eco-friendly construction can not only help to create a better outdoor environment, it can also help to build a healthier indoor environment. Conventional building materials and methods have been linked to a wide range of health problems. Chemical pollutants from paints, solvents, plastics and composite timbers, along with biological pollutants such as dust mites and moulds are known to cause symptoms such as asthma, headaches, depression, eczema, palpitations and chronic fatigue syndrome. Green buildings eliminate these problems through good ventilation design, breathable walls, and the use of natural, non-toxic products and materials. There are many good reasons why we should use eco-friendly construction methods and materials. Some of the green building materials are

1.1 Graphene

Graphene is a one-atom thick layer of carbon. It is thin, strong, and flexible, conducts electricity, and is virtually transparent.

1.2 Super waterproof material

A material made up of tiny cones not only repels water, it can stand up to extreme changes in temperature, pressure, and humidity. The water-droplets bounce off, carrying dirt with them, making the material antibacterial.

1.3 Aero-graphite

It is made from hollow carbon tubes; this material is strong but bendable, stable at room temperature, and able to conduct electricity. It can be compressed and returned to its normal size while becoming stronger, not weaker. The material can also withstand a lot of vibration.

1.4 Protective material

A material made up of rubber and glassy layers only 20 nanometres thick can stop a bullet in its track, and then close up around the bullet, encasing it in the material. When the material is struck, it liquefies to disperse the energy, and then hardens to close the entryway.

1.5 Self-healing concrete

Concrete with bacteria mixed in is able to seal cracks as they happen. The bacteria are activated by water, and produces calcite, a component of limestone, that fills the crack completely.

1.6 Lightweight material stronger than steel

Researchers have developed a honeycomb-type material that is less dense than water and as strong as some forms of steel. This is the first time scientists have been able to produce a material that exceeds "the strength-to-weight ratio of all engineering materials, with a density below 1,000 kg/m3," according to researchers.

Green building materials can be selected by evaluating characteristics such as reused and recycled content, zero or low off-gassing of harmful air emissions, zero or low toxicity, sustainably and rapidly renewable harvested materials, high recyclability, durability, longevity, and local production.

2 FUNDAMENTAL PRINCIPLES OF GREEN BUILDING AND SUSTAINABLE SITE DESIGN

2.1 Sustainable Site Design

One should encourage higher density urban development, urban re-development and urban renewal, as a means to preserve valuable green space. Designing and construction process that minimizes site disturbance preserves and actually restores or regenerates valuable habitat, green space and associated eco-systems that are vital to sustaining life.

2.2 Energy and Environment

Minimizing adverse impacts on the environment (air, water, land, natural resources) through optimized building site optimized building design, material selection, and aggressive use of energy conservation measures. The Resulting building performance should exceed minimum International Energy Code (IEC) compliance level by 30 to 40% or more.

2.3 Indoor Environmental Quality

Providing a healthy, comfortable and productive indoor environment for building occupants and visitors by constructing a building in such a way, this affords the best possible conditions in terms of indoor air quality, ventilation, thermal comfort, and access to natural ventilation.

2.4 Materials and Resources

Minimizing the use of non-renewable construction materials and other resources, such as energy and water, through efficient engineering, design, planning and construction and effective recycling of construction debris. Maximizing the use of recycled content materials by using modern resource efficient engineered materials.

3 ECONOMICAL GREEN BUILDINGS

The environmental impacts of buildings are enormous. Conventional buildings use large amounts of energy, land, water, and raw materials for their construction and operation. They are responsible for large greenhouse gas (GHG) emissions as well as emissions of other harmful air pollutants. They also generate large amounts of construction and demolition (C&D) waste and have serious impacts on plants and wildlife. But it did not implies that rectifying these problems through constructing green building is an expensive task.

Over the life of a sustainable building, net costs are typically lower than traditional development, primarily through energy savings. In many green projects, the productivity gains more than repay any increase in capital costs. In fact, often a green building will pay for itself sooner than a traditional structure. A key factor in cost effective green development is integrating sustainability into the project from the outset, designing from the start a green project, rather than tacking on green elements to a traditional building. In any given project, integrating sustainability leads to lower capital costs. In the end, sustainable development is not about spending money to be "green." Simply, sustainable green development saves money.

CONCLUSION

The 1987 World Commission on the Environment and Development defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Traditional building practices often do not stand up to this ideal, necessitating inefficient energy use, using non-recyclable construction materials, and over-consuming land, timber, plastics, and chemicals. Green development projects, on the other hand, respect future generations and provide today's developers and building users with the satisfaction of "doing the right thing" by owning the financial, environmental, and social responsibilities of beneficial development.

Driven by external market pressures and associated prices, green building is fast becoming the industry standard, and with energy and petroleum costs rising, the demand for energy-efficient technology will continue to increase. State and federal regulations demand that industries become increasingly leaner and more energy efficient, and that future policies and incentives reward those who incorporate energy efficiency into their projects. Clearly, this is the case in the residential and commercial building industries as grants, tax incentives, and government support are increasingly allocated to more energy efficient and sustainable projects. Undertaking green development projects demonstrates a commitment to quality, permanence, and stewardship that improves an owner's or a developer's reputation in the community and in the industry as a whole. Those involved with sustainability are viewed as innovators, exemplars, and leaders in their fields and good people to do business with in the future.

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