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Sustainability assessment of family house

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Abstract

Sustainable construction of buildings provides an ethical and practical response to issues of environmental impact and resource consumption. Sustainability assumptions include the entire life cycle of the building and its significant components, from resource extraction through disposal at the end of the materials' useful life. Sustainable building design relies on renewable resources for energy systems, recycling and reuse of water and materials, minimal intervention for landscaping, passive heating, cooling, and ventilation; and other approaches that minimize environmental impact and resource consumption. At present, sustainable buildings are defined by the assessment systems, that rate and certify them. Building assessment systems simply score or rate the effects of a building's design, construction, and operation, among them environmental impacts, resource consumption, and occupant health. Health in building can be deduced by the presence or absence of chemical and biological substances within circulating air, as well as the relative health and wellbeing of the building occupants. Building assessment systems used in the world evaluates various types' buildings (office, hotels, government buildings, educations, institutional, industrial facilities, facilities of health-care, residential buildings). Assessment systems evaluate new buildings, major renovations or existing buildings. The aim of this paper is to highlight the evaluation of the selected family houses in various categories aimed at location and site, building constructions, energy efficiency, water efficiency and waste.

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Keywords: environmental assessment buildings, certify, environmental impact, resource consumption, occupant health

1. Introduction

Sustainable construction refers to both a structure and the using of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from site to design, construction, operation, maintenance, renovation and deconstruction. In other words, sustainable construction involves finding the balance between

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homebuilding and the sustainable environment. This requires close cooperation of the design team, the architects, the engineers, and the client at all project stages. New technologies are constantly being developed to complement current practices in creating greener structures. The common objective of green buildings is to reduce the overall impact of the built environment on human health and the natural environment by: efficiently using energy, water, and other resources, protecting occupant health and improving occupant productivity and reducing waste, pollution and environmental degradation. The built environment has a vast impact on the natural environment, human health, and the economy [1]. By adopting sustainable construction or green building strategies, we can maximize the environmental, social and economic performance. Sustainable building methods can be integrated into buildings at any stage, from design and construction, to renovation and deconstruction. However, the most significant benefits can be obtained, if the design and construction team takes an integrated approach from the earliest stages of a building project [1].

2. Sustainability Assessment of Buildings

At present, high-performance green buildings are defined by the assessment systems that rate and certify them. Building assessment systems simply score a building project on how well it lines up with the general philosophical approach developed by the designers of the assessment system. One advantage of relying on building assessment systems for this purpose is that it standardizes the boundaries of what constitutes a high performance green building, what are its important attributes, and how the performance of the project across a wide variety of categories is measured [1]. Sustainable building brings together a vast array of practices, techniques, and skills to reduce and ultimately eliminate the impacts of buildings on the environment and human health. For sustainable building it is often emphasizes taking advantage of renewable resources, e.g., using sunlight through passive solar, active solar, and photovoltaic equipment, and using plants and trees through green roofs, rain gardens, and reduction of rainwater run-off. Many other techniques are used, such as using low-impact building materials or using packed gravel or permeable concrete instead of conventional concrete or asphalt to enhance replenishment of ground water. While the practices or technologies employed in sustainable building are constantly evolving and may differ from region to region in the world, fundamental principles persist from which the method is derived: siting and structure design efficiency, energy efficiency, water efficiency, materials efficiency, indoor environmental quality enhancement, operations and maintenance optimization and waste and toxics reduction [3]. Environmental assessment of buildings, green building construction is becoming increasingly important for building owners, builders and developers all over the world. Building assessment systems rate the effects of a building's design, construction, and operation, among them environmental impacts, resource consumption, and occupant health. Environmental effects can be evaluated at local, regional, national, and global scales. Resource impacts are measured in terms of mass, energy, volume, parts per million (ppm), density, and area. Building health can be inferred by the presence or absence of chemical and biological substances within circulating air, as well as the relative health and well-being of the occupants [1]. There are several significant building assessment systems that are used in other countries and provide other perspectives on how to approach the problem of determining how environmentally friendly a given building design may be. The effort to build a sustainable buildings establish of building assessment systems. The first building rating system in the 1990s in the U.K was Building Research Establishment's Environmental Assessment Method (BREEAM). In 2000, the U.S. Green Building Council (USGBC) followed suit and developed and released criteria also aimed at improving the environmental performance of buildings through its Leadership in Energy and Environmental Design (LEED) rating system for new construction. Green Globes is a building assessment system used in Canada which is supported by the Green Building Initiative (GBI). CASBEE is the Japanese building assessment system, which was developed as comprehensive green building rating tools for many markets and building types. Green Star is the major Australian green building assessment scheme and is similar in many respects to BREEAM and LEED in its approach and structure [1]. Many building assessment systems used in the world evaluates various type buildings, for example office, government buildings, commercial interiors, educations, institutional and industrial facilities, facilities of health-care, residential buildings, neighborhood development. Buildings are evaluated in state pre-design, new buildings, existing buildings, major renovations, operations and maintenance of building. Building assessment systems are structured to provide evaluation in several categories: Sustainable Sites, Land Use & Ecology, Water Efficiency, Energy Efficiency and Atmosphere, Materials