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# AN OVERVIEW ON GREEN BUILDING CERTIFICATION PROCESS

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***Abstract*** **-** The construction and real estate industries have experienced significant shifts in the face of growing concerns about climate change, environmental degradation, and resource depletion. Among these trends is the implementation of Green Building Certifications (GBCs), which assess the sustainability of building designs, construction, and operations. This paper introduces the concept of Green Building Certification: its history, importance, types, benefits for environmental, economic, social sustainability and case studies.
Keywords: Green Building, Certification, Environment, Sustainability, Real estate.

## 1. Introduction

Green Building Certification (GBC) is an essential component of the global movement towards sustainable development in the built environment. Buildings are responsible for a significant proportion of energy consumption, water usage, waste generation, and carbon emissions. By adopting green building practices and getting certification, developers, architects, and owners will reduce the impact of their projects on the environment while upholding the wellness of the occupants. Certification schemes provide a structured approach to discussing and promoting the environmental performance of buildings.

This paper therefore aims to provide an all-rounded introduction to Green Building Certification, by revealing the importance of well-recognized key certification systems and their criteria, alongside the advantages these hold for the environment, the economy, and society.

## 2. Development of Green Building

The idea of green building began in the 1970s. Some early initiative works included reduction of energy consumption within buildings. Post the 1973 oil crisis, there was a spate of interest in energy-efficient building technologies, culminating in the first energy-efficient standards and guidelines. The following decades focused toward the holistic sustainability in which, besides energy efficiency, water conservation and waste reduction and indoor environmental quality should be added.

These growing concerns gave rise to green building certifications. They are a set of standards for designing, constructing, and operating buildings that minimize their impact on the environment with the overall health and welfare for occupants.

## 3. Major Green Building Certification Systems

### 3.1. Leadership in Energy and Environmental Design (LEED)

The LEED program is the most familiar and utilized green building certification scheme globally. It was developed by the U.S. Green Building Council in 1998. LEED gives an all-encompassing framework for designing, building, operating, and maintaining green

buildings. The certification assesses buildings on several criteria, such as:

- Water efficiency
- Sustainable site development
- Energy and atmosphere
- Indoor environmental quality
- Innovation in design
- Materials and resources

This program offers a LEED certification in four different levels, depending upon the volume of points achieved by the built structures of these categories: Certified, Silver, Gold, and Platinum.

### 3.2. BREEAM (Building Research Establishment Environmental Assessment Method)

BREEAM is one of the oldest green building certification systems; it was originally developed in the UK by the Building Research Establishment in 1990. BREEAM examines the sustainability performance of buildings on a portfolio of primary and secondary issues including energy efficiency, water usage, and indoor air quality as well as environmental implications of the materials used during construction. BREEAM uses a rating system similar to LEED with classifications which range from Pass to Outstanding.

### 3.3. WELL Building Standard

The WELL Building Standard places its emphasis on the health and wellbeing of occupants. LEED and BREEAM argue for environmental sustainability, while WELL would look at the aspects such as air quality, lighting, acoustic parameters, and ergonomic design. This is more relevant to commercial buildings where occupant health and productivity are a concern.

### 3.4. Green Star:

Green Star is a certification system designed by the Green Building Council of Australia (GBCA). Like LEED and BREEAM, Green Star rates buildings based on energy use, water efficiency, and indoor environmental quality among others. It provides certifications for new and existing buildings and is regarded as one of the most popular green building rating systems in the Asia-Pacific region.

### 3.5. Living Building Challenge

The Living Building Challenge is a certification program offered by the International Living Future Institute. It is considered the most stringent green building certification, requiring buildings that are net-zero energy, net-zero water, net-zero waste, and positive for ecosystems. Besides, social justice and equity criteria are also included in the certification.

## 4. Advantages of Green Building Certification

### 4.1. Environmental Benefits

The most glaring benefit in green building certification is its environmental impact reduction. Green buildings that have received certification usually consume lesser amounts of energy, reduce greenhouse gases emissions, conserve water, and create less waste as compared to other conventional buildings. Some of the benefits boost mitigation of climatic change and preserving natural resources.

### 4.2. Economics BENEFITS

Investing in green buildings can prove to have significant long-run economic benefits. Energy-efficient buildings reduce the costs of operation by saving energy and water, and better indoor environmental quality enhances productivity and reduces occupant healthcare costs. Green buildings are also considered more attractive to tenants and buyers, increasing property values and rents.

### 4.3. Social Benefits

Green buildings contribute to people's welfare by providing healthier interior environments. Better air quality, natural lighting, and noise control will enhance productivity, reduce absenteeism, and augment the overall quality of life. Additionally, most green building certification requirements necessitate non-toxic and sustainable use of materials, reducing exposure to harmful chemicals and supporting health.

### 5. International Adoption and Case Studies

Green building certification has gained widespread acceptance across the globe with countries worldwide initiating their own certification systems or opting for international standards. For instance
• The Edge, Amsterdam: There are extremely good examples of LEED Platinum and BREEAM Outstanding certifications in the world-famous The Edge, which is often touted as being among the world's most sustainable office buildings. The building features cutting-edge technology, such as solar panels, intelligent lighting, and rainwater harvesting.
•t**One Central Park, Sydney:** One Central Park in Sydney is Australia's first green pioneer, green star certified, and comes equipped with sustainable features such as vertical gardens and high-efficiency energy management.
•t**The Bullitt Center, Seattle:** A "greenest commercial building in the world," the Bullitt Center is the world's first commercial office building to meet Living Building Challenge certification. It includes net-zero energy, composting toilets, and a rainwater harvesting system.

### 6. Challenges and Future of Green Building Certification

While it is true that the adoption of green building certification has skyrocketed, still there are a number of challenges remaining. These include high initial construction costs, as well as complicated processes for obtaining certification, and indeed a lack of integration of conventional green building concepts into standard construction practice. Moreover, at times the inconsistency between different systems confuses developers and architects.

The future of green building certification is in the extensification scope of certifications into further aspects of building lifecycle management, integration of climate resilience strategies, and in developing certifications that would adapt to local conditions and available resources.

### 7. Conclusion

Green building certification has emerged as a key instrument for promoting sustainability in the built environment. In light of the various certification systems developed globally, stakeholders have the challenge of creating buildings that are not only environmentally responsible but also healthier and more efficient. With increasing concern for sustainability worldwide, it is certain that the role of green building certifications will increasingly shape a sustainable future for our cities and communities.

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