

Collaborative System for HK-BEAM Green Building Certification

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Abstract. The built environment is moving towards sustainable development. The number of green buildings increases worldwide in recent years. Green buildings are environmentally, socially and economically desirable. However, the certification of green buildings is often expensive and labor-intensive. The document preparation and review process for green building certification is iterative in nature and requires collaboration of many project participants, certification organizations, and third party engineering consultants. In this paper, we focus on the green building certification in Hong Kong. The BEAM standard, established in 1996, is used for assessing and labeling green buildings in Hong Kong and cities in mainland China. Based on the BEAM standard, we have developed a web-based collaborative system that aims to facilitate the document management and certification planning for BEAM. The role-based access control of the system ensures the right information is available to the right people. This paper presents the features and the underlying logic of the system.

Keywords: Green building certification, Collaborative system, Document management, Hong Kong Building Environmental Assessment Method (HKBEAM).

1 Introduction

The built environment is moving towards sustainable development. As of 2011, there were over 10,000 construction and renovation projects certified by LEED (Leadership in Energy and Environmental Design) in the United States alone [1]. The concept of green buildings not only suggests the design and construction of environmental and social friendly new buildings, but also advocates the renovation of existing buildings for higher building performances. There are various interpretations of green buildings. ASTM defines a 'green building' as 'a building that provides the specified building performance requirements while minimizing disturbance to and improving the functioning of local, regional, and global ecosystems both during and after its construction and specified service life,' and a building that "optimizes efficiencies in resource management and operational performance, and minimizes risks to human health and the environment" [2]. Undoubtedly, the number of green buildings will continue to increase worldwide in the coming years.

Green buildings reduce overall impact to the environment and protect occupant health. Green buildings may cost more up front, but save through lower operating costs over the building life time due to the improved efficiency in consumption of energy, water, and other resources. Green buildings are therefore environmentally, socially and economically desirable. However, since each building is unique and “one-of-a-kind” in nature, design of green buildings takes time and human efforts. In addition, certification of green buildings is often expensive and labor-intensive. The certification process requires collaborative efforts from various project participants including the client (owner), architects, contractors, assessors, and certification organizations. Document preparation, submission, and review are usually the most labor-intensive and time-consuming stages in green building certification. In this paper, we present a web-based collaborative system for green building certification that we designed and developed based on the needs in Hong Kong.

2 Green Building Certification in Hong Kong

Green building certification standards provide the guidelines to measure, improve, certify, benchmark, and label the whole-life environmental sustainability and performance of buildings. Commonly used green building certification standards include LEED in North America, BREEAM (BRE Environmental Assessment Method) in the United Kingdom, and Green Star in Australia. Those standards are often separated into two groups – certification for new buildings and certification for existing buildings. The details of the assessment criteria and the certification process are clearly stated in those standards.

2.1 The BEAM Standard

The certification standard used in Hong Kong is called Hong Kong Building Environmental Assessment Method (HK-BEAM), or simply BEAM. It is a voluntary scheme which is overseen by the BEAM Society, an independent non-profit organization and a founding member of Hong Kong Green Building Council (HKGBC). Established in 1996, the BEAM standard covers all types of new and existing buildings: residential, commercial, institutional, and industrial. As of March 2010, BEAM has been applied in around 240 landmark properties in Hong Kong, Beijing, Shanghai and Shenzhen, comprising over 10.5 million square meters of spaces and 56,000 residential units [3]. On a per capita basis, BEAM has assessed more buildings and more square meters of space than any other similar scheme in use worldwide [3].

Like other green building certification standards, BEAM has several Overall Assessment Grades (Platinum, Gold, Silver, and Bronze) which are determined based on the number of credits obtained by the building under assessment. The credits are grouped into five categories – (1) Site Aspects, (2) Materials Aspects, (3) Energy Use, (4) Water Use, and (5) Indoor Environmental Quality (see Table 1). In each category, prerequisites must be satisfied in order for the credits within the same category to be counted towards the awards. Under the category Innovations and Additions, BEAM also awards credits to client’s proposals for aspects that are not included in BEAM