

A study on the Green Building Certification Criteria for Public Facilities in Korea

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ABSTRACT: In 2008, the oil price has risen 200% by 2007. The high price of energy source and the pollution of its use have arise worldwide concerns. As the result, the tools to evaluate the performance of buildings in terms of energy efficiency have attracted attentions. For examples, BREEAM(1991) by UK, LEED 2.0(2001) by US, GBTool(2002) by Canada, etc. These tools have been developed by the central government. They have tried to introduce these into public facilities in previous as the public facilities play an important role in urban life-They provide a place for the purpose of communication, administration, relaxation etc. The purpose of this study is to prepare the fundamental data to develop the criteria to assess the performance of Green building assessment for public facilities.

Keywords: Green Building, Public Facilities, Certification Criteria

1. INTRODUCTION

In recent years the built environment has a profound impact on the natural environment, the economy, and human health and productivity. Buildings account for over 33.3% of the nation's energy use and as a result, for over 50% of CO₂ emissions in the South Korea. Local and the state governments across the South Korea and around the world have begun to do research on how to mitigate this impact in order to preserve essential natural resources. Many researchers involved in this research have

begun to turn to green building to reduce the impact from development.

The enforcement of Green Building Certification Criteria in Korea since 2002 began with Multi-unit Residential Building, and now Green Building Certification Criteria for Mixed-use dwellings, Office building, School, Hotel, and Store are enforced. Although construction rate of the above 6 buildings (Table I) is higher than that of other buildings, environmental performance assessment for other buildings need to be considered. Especially the GBCC for Public facilities which has high

Table I. Domestic and Abroad Certification Criteria and the Necessity of Development

Use of the Building	Domestic Certification Criteria	LEED 2.2	GBTool 2005	Necessity of Development
Single-family houses		O		B
Multi-unit residential building	O	O	O	□
Cultural and Meeting		O	O	A
Store	O	O	O	A
Medical		O	O	A
School	O	O	O	□
Sports		O	O	B
Office building	O	O	O	□
Hotel	O	O	O	A
Mixed-use dwellings	O	O	O	A
Warehouse		O	O	B
Sightseeing		O	O	A
Waste treatment		O	O	B
Storage and treatment of dangerous goods		O	O	B
Public facilities		O	O	A
Graveyard		O	O	B

*: Developed, A: Preferential development, B: Developing later

construction rate should be preferentially developed.

In this study, we will analyze the items of certification criteria between domestic and abroad. Then we will drive the basic material for Green Building Certification Criteria of Public facilities through case study.

2. INVESTIGATION OF PUBLIC FACILITIES

2.1 Definition of Public Facilities

It is difficult to find a unified definition of public facilities. Generally, a public facility is defined as a building which can provide convenience and welfare for the citizens, and they are managed by the fund of the public sector. Broadly speaking, the civilian facilities which people can pay money to use are also included in public facilities. Based on the function of city Public Services public facilities can be divided into four parts, such as routine services, protective services,

developmental services, social minimum services, and etc. The concrete contents are illustrated in Table II.

2.2 Necessity of Green Technologies in Public Facilities

Recently, with the improvement of people's living standard, more and more people pay attention to the quality of the life for leisure activities, and there is an increasing demand for health, culture, entertainment and public welfare. Therefore, to meet this demand, quantitative and qualitative expansion of the urban public services should be greatly enhanced. Especially, the public facilities which have a close relationship with people's daily life should be preferentially developed. For instance, the public library in the region is not only a building simply to provide a learning space, but also a building plays a role of regional information centre for

Table II. Classification of City Public Service

Classification	routine services	protective services	developmental services	social minimum services
Identification	Everyone enjoy the right of use	Protecting personal safety and property, maintaining public order	Improving personal physical, mental potential	On the dimension of the central government
Category	water supply and drainage, waste recovery and utilization, road and traffic	police, fire fighting, law enforcement agency, administrative court, and etc.	education, library, zoo, recreation facilities	official aid, hospital and public health, food support, vocational training, and etc
Characteristic	level of the service according to rental fee	ability of accident prevention and settlement or salvation after the fact	In principle, facing the whole society, but there are regional differences	minimum and basic social service should be provided for the people who can't get the service in other ways

Source: Seoul Development Institute. 1995.

people's exchanges and mutual learning, and promote the level of healthy living. Now, it is well known that Green Building becomes the mainstream, and green libraries are a part of the larger green building movement, which are also known as sustainable libraries, green libraries are being built all over the world. Many people view the public facilities as having a unique role in the green building movement due to its altruistic mission, public and pedagogical nature. They are long-term investments of the community, so architects need to forecast today's mainstream and 50 or 100 years into the future when designing them, and consider the element of green building.

3. TO COMPARE AND ANALYZE GREEN BUILDING CERTIFICATION CRITERIA

The United States Green Building Council (USGBC), a national non-profit entity, developed the Leadership in Energy and Environmental Design (LEED) Green Building Rating System to rate new and existing commercial, institutional, and high-rise residential buildings according to their environmental attributes and sustainable features. The Certification Criteria of LEED can be divided into six categories and four

levels as illustrated in Table III. Although LEED is imperfect and still evolving, it has rapidly become the largest and most widely recognized green building design and certification program in the US, and probably in the world.

Beginning January 2003, the Green Building Certificate System in Korea, which has been in force since January 2002, will be extended to the semi-residential buildings, office buildings (public and private), commercial buildings and remodeled buildings. By the end of 2007, several additional Certification Criterias have been developed and applied to practice which correspond respectively to Multi-unit residential building, Office building, Mixed-use dwellings, School, Hotel, and Store. (Table III)

4. CASE STUDY

The Semiahmoo Library & RCMP Community Policing Station has received LEED^{TMTM} Silver Certification from the U.S. Green Building Council's LEED 2.0 Green Building Rating System. This system associates points with a wide range of environmental goals. Semiahmoo Library is the first library in British Columbia to be LEED certified.

Table III. LEED & GBCC

LEED			GBCC							
Category & Score (69)	Sustainable Sites	14	Category & Score		Multi-unit residential building	Office building	Mixed-use dwellings	School	Hotel	Store
	Water Efficiency	5								
	Energy & Atmosphere	17		Land Development & Commuting Transportation	27	12	10	11	13	8
	Materials & Resources	13		resources, water resources, atmosphere pollution	29	74	64	68	69	74
	Indoor Air Quality	15		Ecological environment	30	19	19	21	17	10
	Innovation & Design Process	5		Indoor environmental quality	14	31	22	24	34	27
Grade	Certified	26~32		Addition	20	0	0	0	0	0
	Sliver	33~38		Total	120	136	115	124	133	119
	Gold	39~51	Grade	Best	85 points or more					
	Platinum	52~69		Excellent	65 points or more					

Sustainable Site: prevent loss of soil during construction and sedimentation of storm sewer or streams; reduce pollution and land development impacts from automobile use – close to bus lines; reduce light pollution, etc.

Water Efficiency: reduce potable water consumption for landscape with native plants and no irrigation; maximize water efficiency, etc.

Energy & Atmosphere: building envelope and systems designed to maximize energy performance; energy performance optimized, etc.

Materials & Resources: 88% of construction waste was recycled or salvaged; 40% of materials used were manufactured with 500 miles of the Site, etc.

Indoor Environment Quality: no smoking in building; CO₂ monitoring system installed to enhance efficiency of air exchange system, etc.

5. CONSLUSION

Today, the green building has become the mainstream. Green or sustainable building is the practice of creating healthier and more resource-efficient models of construction, renovation, operation, maintenance, and demolition. Effective green building can also save construction costs by increasing productivity and using less energy and water. A report made in the State of California states that an upfront investment of 2% in green building design, on average, results in life cycle savings of 20% of the total construction costs –more than ten times the initial investment.

In Korea, a total of 216 registered building projects have completed green building certification until the end of 2006, and all indications are that the growth of green building will continue. This study gives a general idea about the development of Green Building Certification Criteria for Public facilities. Further study related to detailed items of GBCC for Public facilities will be made in the future.

ACKNOWLEDGEMENT

This research was supported by Sustainable Building Research center of Hanyang University which was supported the SRC/ERC program of MEST (R11-2005-056-03001)

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