CRITERIA WEIGHTING OF GREEN BUILDING INDEX MALAYSIA

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MASTER OF SCIENCE
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CRITERIA WEIGHTING OF GREEN BUILDING INDEX MALAYSIA

by

RETNO RAHARDJATI

A Thesis

Submitted to the Postgraduate Studies Programme

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BANDAR SERI ISKANDAR,

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AUGUST 2011

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ABSTRACT

The Green Building Rating System (GBRS) is an effective framework for assessing building environmental performance into green building. Several GBRS are in use today and are developing at all levels. In May 2009, Green Building Index Malaysia (GBI) was launched as design guides and standards of green building in Malaysia. GBRS is always dynamic, being adapt and adopt from other rating systems. As a reflection of this dynamism, energy efficiency in building assessment appears as the main criterion in most GBRSs, including GBI. A difficulty then arises when those systems do not imply to be used across multiple countries and often they have features with a significant local favor. GBRS must also represent the geographical location and climatic condition of its original country. Therefore, this study undertakes comparative analysis of international GBRS, which are LEED, BREEAM, CASBEE, Green Star, and Green Mark with GBI. The analysis reveals that GBI closely adopted the LEED rating award and its criteria, although both are used in a different geographical zone and under different climatic conditions.

According to that particular result, furthermore, this research defines new weighting criteria of GBI with respect to the local conditions in Malaysia by analysing these criteria with questionnaires from various expert respondents using Analytical Hierarchy Process (AHP) method. This research is focused on GBI Non Residential New Construction building (GBI-NRNC). GBI is based on the six criteria, which are “Energy Efficiency”, “Indoor Environment Quality”, “Sustainable Site Planning & Management”, “Materials and Resources”, “Water Efficiency” and “Innovation”. From the six criteria, current GBI-NRNC has more emphasis on Energy Efficiency (EE). In AHP questionnaire, respondents rank the relative importance of each criterion and sub criterion in pairwise comparison, with the scale of 1 to 9 and then the criteria were weighted to meet the priority. The respondents chose which criterion is reasonable to be the main criteria in green building assessment. The analysis shows that based on respondents’ judgment, the current GBI are different

from GBI survey result in their criteria and sub criteria weighting. GBI survey result identified “Indoor Environmental Quality” as a main priority, while current GBI identifies “Energy Efficiency”.

Finally, evaluation based on the project of “SIME office building” was carried out. The evaluation of the building was conducted by using the rating system of the current GBI and GBI survey result. Based on the current GBI, the project gains 61 points, thus will achieve “Certified” certification. On the other hand, the evaluations based on GBI survey result, the project gains 70 points, and qualify for “Silver” certification. The results were then validated by the certified GBI facilitators.

ABSTRAK

Green Building Rating System (GBRS) adalah satu rangka kerja yang efektif untuk menilai tahap persekitaran bangunan samada mematuhi atau sebaliknya konsep “Rumah Hijau”. Beberapa GBRS telah digunakan masakini dan sentiasa dinaiktarafkan. Pada Mei 2009, Green Building Index Malaysia (GBI) telah dirasmikan sebagai garis panduan bagi konsep “Rumah Hijau” di negara ini. Kriteria-kriteria di dalam GBRS adalah satu refleksi dinamisme dimana “kecekapan tenaga” sering merupakan kriteria utama bagi penilaian sesebuah bangunan, termasuk GBI. Kesulitan timbul bila sesetengah sistem tidak dapat disesuaikan di beberapa negara kerana wujudnya ciri-ciri dan signifikan tempatan yang tersendiri.

GBRS juga bergantung kepada lokasi geografi dan keadaan iklim bagi negara-negara berkenaan. Oleh kerana itu, kajian ini dilakukan berdasarkan perbandingan analisis dari GBRS antarabangsa, iaitu LEED, BREEAM, CASBEE, Green Star dan Green Mark dengan GBI. LEED dan GBI kedua-duanya digunakan pada kedudukan geografi, zon dan iklim yang berbeda, namun kedua-dua sistem ini banyak persamaan dari segi kriteria-kriteria dan *“rating award”*.

Dengan menggunakan kaedah *“Analytical Hierarchy Process”* (AHP), maklum balas daripada pelbagai pakar responden diperolehi melalui borang soal selidik. Berdasarkan analisis, pemberatan kriteria yang baru telah diperolehi bagi GBI yang bersesuaian dengan keadaan di Malaysia. GBI diasaskan berdasarkan enam kriteria iaitu “kecekapan tenaga”, “kualiti persekitaran dalaman”, “kelestarian perancangan dan pengurusan tapak”, “pengurusan bahan dan sumber”, “kecekapan air” dan “inovasi”. Daripada enam criteria tersebut, kini GBI-NRNC lebih menekankan kepada “kecekapan tenaga”.

Di dalam soal selidik AHP, responden telah memilih kriteria yang bersesuaian dengan kriteria utama penilaian untuk “Rumah Hijau”. Daripada hasil analisis, berdasarkan penilaian responden, pemberatan kriteria dan sub-kriteria GBI kini adalah berbeda daripada keputusan kaji selidik GBI. Keputusan kaji selidik GBI menunjukkan “kualiti persekitaran dalam” adalah keutamaan utama, sementara GBI kini dikenalpasti sebagai “kecekapan tenaga”.

Bagi tujuan pengesahan, penilaian dibuat ke atas “Bangunan SIME” dengan menggunakan pemberatan GBI kini dan GBI hasil kaji selidik. Berdasarkan analisis menggunakan pemberatan GBI kini, sejumlah 61 mata dicatat sekaligus mencapai sijil *“diperakui”*. Manakala, berdasarkan pemberatan GBI hasil kaji selidik, projek yang sama mencatat 70 mata dengan pengiktirafan sijil *“Silver”*. Keputusan ini kemudiannya disahkan oleh fasilitator GBI yang diiktiraf.