

[CON 11] A REVIEW OF SUSTAINABLE AND GREEN CONSTRUCTION AWARENESS AMONG CONTRACTORS IN MALAYSIA

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ABSTRACT

Sustainable and green construction is the manner of using processes and erecting buildings that are resource efficient and environmentally responsible. Sustainable and green construction brings uncountable benefits to the social, environmental and economic sectors. This type of construction approach should be taken seriously as the twenty four percent of total carbon dioxide is produced from the construction industry in this country. The level of awareness of sustainable and green practices in construction projects in Malaysia is still unsatisfactory. Even though it is increasing, the response and progress rate should be made higher to meet the global standard. To investigate the degree of appreciation, a general interview guide approach with qualitative analysis is utilized as it allows the collection of general information from the interviewees. The aim of this research is to promote a sustainable environment in the construction proximity. Therefore, the objective of this paper is to investigate the level of commitment contractors in the northern part of Malaysia have, with regards to sustainable and green construction practices. The level of collaboration between the government and private sector will also be investigated. It is found that less than one percent of construction projects in Malaysia are certified as green and sustainable. It is therefore recommended that in future researches, a broader spectrum of respondents should be investigated.

Keywords: *sustainable, green construction, private sector*

INTRODUCTION

Sustainable and green construction can define as an effort to reduce the harm of construction activities to environmental for improved quality of human's life and protect the natural by use the resource efficiency and avoid resource depletion. Green and sustainable construction issue are earning more solicitude by worldwide as construction industry is the heaviest consumer of natural resources which would bring harm to the environment. According to a study conducted by Global Green of USA, 40% of the world's natural resources and non-renewable energy resources used is related to the construction and building maintenance activities. Indeed, the construction industry is among the biggest contributors to environmental pollutions, waste and acceleration of global warming.

The aim of this paper is to promote a sustainable environment in the construction proximity. Thus, the objective of this paper is to investigate the level of commitment of contractors sustainable and green construction practices. The level of co-operation

between the government and private sectors will also be investigated.

The prompt growth of construction industry brought undesirable influences to the environment. Uncontrollable construction will lead to energy waste, physical destruction, environment pollution, high energy consumption and cause health problem if used of improper materials. However, the progress and advancement of Malaysia in green and sustainable construction are tardy and ungratified. The conventional construction activities lead to resource deterioration, chemical pollution, physical disruption and flash flood as in Klang Valley and Kuala Lumpur. Therefore, the implementation of sustainable and green construction is desired to mitigate the environmental problems caused by construction and development activities.

LITERATURE REVIEW

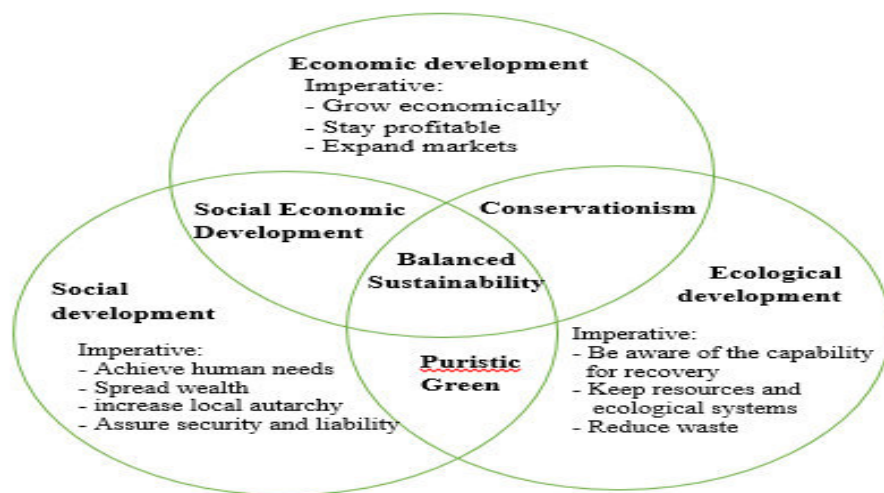


Figure 1

The relations of three principles of balanced sustainability

Source: adapted from Environmental Concerns in Malaysian Construction Industry

Green buildings are primary sustainable New Economic Model elements that supply to continuing growth that have been emphasized under the Malaysia Construction Industry Master Plan (2005-2015) (Hamid, 2012). To promote balanced sustainability in construction, three principles are governed for a greener construction: environmental, social and economic. (Nazirah Zainul, 2010). There are various programs, policies and tools available in Malaysia for developing sustainable and green construction industry.

Industrialized Building System (IBS)

Industrialized Building System is a construction method in which elements are created in an organised environment (on-or-off site), transported, located and assembled into a building with slight added site works. Malaysia has recognized the need for developing IBS in early 1960's. As early as 1999, Malaysia adopted IBS Strategic Plan. Then, IBS Roadmap was established for 2003 to 2010 (Kamar & Hamid, 2011).

Green Building Index (GBI)

Green Building Index or GBI is initiated by Malaysian Institute of Architects (PAM) and the Association of Consulting Engineers Malaysia (ACEM) in 2009. GBI is a green rating tool which designed specifically for the Malaysia's tropical climate, current

economic, infrastructure and social development (Greenbuildingindex.org, 2016). The GBI award is given based on the GBI points obtained. (Jamilus, Ismail, & Aftab, 2013)

Table 6
GBI award ratings

GBI Points	Award
86 and above	Platinum
76 to 85	Gold
66 to 75	Silver
50 to 65	Certified

Source: <http://new.greenbuildingindex.org/>

Below are examples for GBI-certified projects. As shown in figure 2, the Cyberjaya Mosque which equipped with Building-Integrated Photovoltaic System to harvest solar energy. It is also reward as platinum GBI-rating building.



Figure 2

Cyberjaya Mosque

Source: <http://new.greenbuildingindex.org/>

Figure 3 shown one of the gold GBI-rating buildings, the Sime Darby Idea House which located in Shah Alam. It is also the first carbon neutral home in South-East Asia.



Figure 3

Sime Darby Idea House

Source: <http://new.greenbuildingindex.org/>

Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST)

Malaysian Carbon Reduction and Environmental Sustainability Tool (MyCREST) is introduced by Construction Industry Development Board (CIDB). It is aimed to lead, support, measure, and decrease the constructed environment's effects in order to reduce environmental influence and carbon emissions, and considering a more holistic life-cycle vision of the built environment. MyCREST joins three basic tools, then build a "scoring plan" to assess a building for certification: design tool, construction tool, and operation and maintenance tool (CIDB, 2009). MyCREST has been made a compulsory requirement for government projects which value worth more than RM50 million.

Tax incentives

The government has applied an instrument to cultivate the green building investment which is introduced green tax exemptions and reductions, and investment incentives. Among the incentives are:

1. Corporate tax incentives for organizations conserving and generating renewable energy by using biomass, hydropower and solar power.
2. Company tax incentives for generation of the renewable energy source for own utilization.
3. Corporate tax incentives for those organizations and corporations which offering well-organized energy conservation facilities.
4. Income tax or stamp duty incentives for GBI-certificated buildings. (Aliagha, Hashim, Sanni, & Ali, 2013)

Site Waste Management Plan (SWMP)

National Strategic Plan for Solid Waste Management (SWMP) was adopted in 2005 until 2020 to form the base for solid waste management strategy and practice in peninsular Malaysia. Since building materials can grab at relatively low cost in Malaysia, therefore the waste minimization, reuse and recycle practices are limited (Papargyropoulou, Preece, Padfield, & Abdullah, 2011).

Lean Construction (LC)

Lean Construction or LC is aimed at decreasing waste, growing productivity, health and safety in achieving the client's requests of the construction industry. LC is able to reduce the overall cost while maintaining the quality and shorten the manufacturing cycle time. LC also has a clear set of objectives which is aimed at maximizing the performance for the end user at the project level. The health and safety issues have been considered in the implementation of lean principles (Marhani, Jaapar, & Bari, 2012).

Green Real Estate (GreenRE)

Green Real Estate (GreenRE) is designed for all construction field and real estate. The purpose is to enhance and encourage the involvement of industry professionals. GreenRE provides efficient solutions for green certification at affordable costs. The experts are advised to design and build sustainable and green building with integrated method. It's targeted at promoting better adoption of green technology and practices amongst the Malaysian Real Estate organizations ("Greener buildings," 2016).

Green Performance Assessment System in construction (Green PASS)

Green Performance Assessment System in Construction (Green PASS) is planned by CIDB which is an independent construction regular, which rates and measures the effect

of structure construction upon the atmosphere. The objective of Green PASS is to establish a robust and reliable database on carbon emissions of construction. It estimates the carbon footprint of building construction works throughout its life cycle. It also provides a framework which linking sustainability with performance to drive towards green and sustainable construction. (Hamid et al., 2004)

METHODOLOGY

The methodological approach applied to investigate this article study is qualitative method. A general interview guide approach is used as it allows the collection of general information from the interviewees. The interview is conducted with three respondents from private sectors. They are practitioners of construction projects in northern Malaysia, which are Perak, Penang and Kedah. The interview is aimed to find out the participation rate of private sector in sustainable and green construction. The respondents are giving commitment in answering the follow-up questions which allow the interview collected more thorough information. Besides answering the interview questions, they also provide useful suggestion and their thought about the implementation of green and sustainable construction in Malaysia. The information is gathered, qualitative analysed and converted to text.

The secondary data are also used to assist in completing this paper. Online journal, official websites, magazines, books and certified statistic reports are exploited. These sources are considerable and helpful due to the availability of numerous credible materials.

ANALYSIS DATA

To have deeper investigated on the causes of low participant's rate in green and sustainable construction, conversation is conducted with construction practitioners from northern Malaysia. According to the three respondents, none of them is applying green construction technology in their construction projects. They do not handle or draw any sustainable and green construction project yet. They have basic knowledge about sustainable and green construction and understand the importance of the green construction, however they do not practice the green techniques in their construction projects.

The main reason of they do not consider sustainable and green construction is, the upfront cost is expensive and affect their profit margin. They understand that the green construction technology such as IBS might help them in cost saving in the long term, however the profit gained from conventional construction technology is more satisfied, therefore, they are not planning to involve green construction technology in this stage.

Besides, the problems of shortage of expertise and skilful knowledge stopped them from considering green construction. Could not deny that CIDB launched various programs related to green construction, however it does not effective due to the furtherance for certain areas is not revealed. For instance, the geo-structure of Alor Setar brings trepidation to the construction participants to implement the green construction method as they worried feasibility of green construction in their area.

In addition, the unskilful labour intensive is relatively cheap compared to modern intensive. The majority or almost all of the construction projects prefer to use labour intensive. This is because they employed foreign labours who willing to work in the construction field with comparatively low salary. Compared to other countries like Hong Kong and Singapore, where have to pay higher wages to their unskilled labour and this might be the burden of the construction project, therefore they tend to develop advanced technology method and applied green idea in their construction industry. In local, the construction participants remain the conventional methods as the labour intensive brings them a sufficient profit margin and does not weight their overall cost.

They added, the availability of the facility of the green construction technology is limited. The IBS factory is only located in progressive states like Selangor and Penang. Even though the construction participants would like to implement IBS in their projects, the cost of transportation of the pre-cast products from the other states to their site might be costly and increase their budgets. Moreover, the green-label construction materials is limited. The construction parties might have to import the materials from overseas and this does not carry economic benefits to them.

Furthermore, they do not consider the tax exemption and incentives provided by government to those GBI-certificated projects. This might due to they do not really recognize about these policies. Another reason is, the incentive is not attractive and they prefer to stay in conventional building methods which they know very well. They suggested, government should offer subsidy to encourage them to get involved in sustainable and green construction.

They claimed, the practise of sustainable and green construction is not practical as the majority of their projects are residential housing, which would not exist the exact same unit and measurement. Therefore, they still prefer to use the timber formwork instead of permanent formwork as it is more costly. The respondent from Penang development is handling high-rise projects, however their projects are not using permanent formwork as the up-front cost is high.

However, there is slightly improved in the adoption of “green” construction. They already replaced timber with steel in reinforcement. Yet, this is due to the cost of timber is increasing and steel gives them bigger profit margin. Nevertheless, they comprehend the negative impact of illegal dumping. Therefore, to avoid waste of construction materials, they make flawless calculation and analysis, order the necessary amount of materials, and resell the remaining construction materials to other party.

Generally, they hold pessimistic assertion for the implementation of green and sustainable construction in Malaysia. The economic situation in Malaysia is languor, the buying power of customers in comparatively lower than previous. Instead of allocating the model to investigate green construction, they rather invest in more budgeted and affordable construction projects. They do admit that the green construction might help them in cost saving in the long term, but they indicate they should not and would not take the initiative.

Likewise, they denote, the character of government is very significant and essential. They willing to pay commitment to government in sustainable and green construction as they also understand the importance of environmental. They suggested, government

should take the initiative and stimulate this green practices in the construction industry. For instance, the government should set up more IBS factories besides in advanced area, import or introduce the affordable green-label construction materials and adopt experienced and professional experts in assisting the feasibility of green construction in Malaysia. Otherwise, they would not involve in green construction voluntary.

A research done on websites of various organizations to investigate the number of green construction projects in Malaysia. The result shows that the application of sustainable and green construction technology in northern Malaysia is disappointed.

Table 7
The distribution of construction project

Number of Projects	2015	2016
Total Construction Projects	40169	29751*
GBI-Registered Projects	70	42**
GBI-Certified Projects	70	27**

Source: i) <http://www.cidb.gov.my/> (* Data for Q1 2016 until Q3 2016)

ii) <http://www.greenbuildingindex.org/> (** Data for September 2016)

From Table 2, it showed the total number of construction project in Malaysia for year 2015 and 2016. There are 40169 construction projects for year 2015, however, only 70 or 0.17% of the projects registered with Greenbuildingindex Sdn. Bhd. (GSB) and all the registered projects have been certified. As of third quarter or September of year 2016, Malaysia has 29751 construction projects, only 42 or 0.14% projects registered with GSB. Among 42 GBI-registered projects, only 27 projects have been certified.

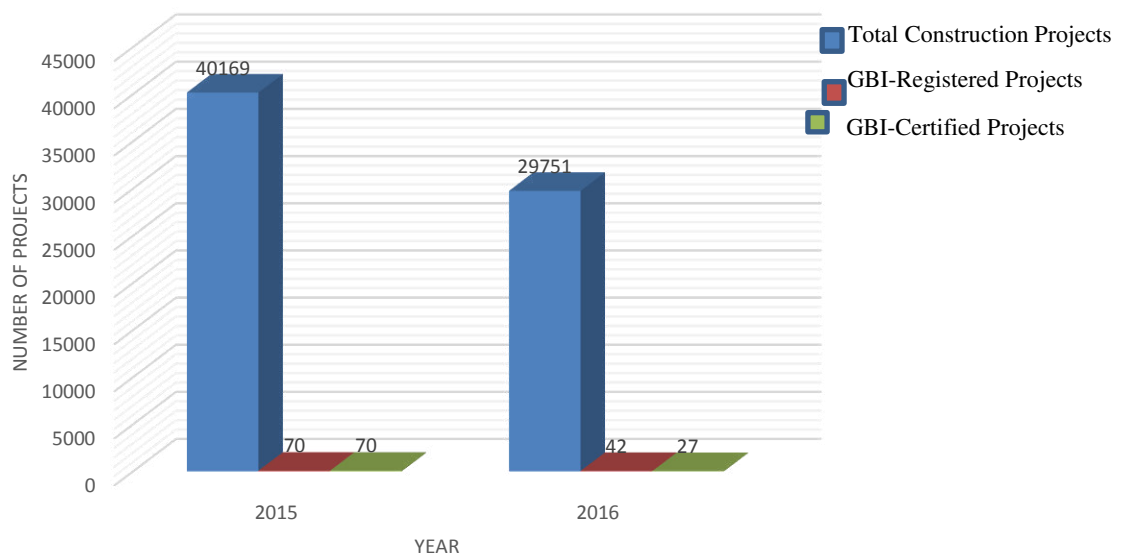


Figure 4

Histogram of the distribution of construction projects from data obtained in Table 2

DISCUSSIONS AND CONCLUSIONS

We could not deny that Malaysian government is putting much effort in promoting sustainable and green construction. Several projects and tools are introduced to

encourage more private organizations to participate in this global trend. However, the progress is gradual. The main objective of private sector is profit. Their main concern is how much profit they can make but not the environmental problems, although they understand the impacts of construction activities on the environment. But this does not mean that government and private sectors could not cooperate. In fact, they should collaborate as a team to achieve their own goals.

Government should promote the sustainable and green construction better and specifically. Financial incentives such as tax reduction or existing tax exemption should be reviewed and adjust to meet requirement of the public sector as this is the best way to increase uptake (Papargyropoulou et al., 2011). Government financial incentives have a significant role to provide risk-less and affordable financial resources for green developers (Samari, Godrati, Esmaeilifar, Olfat, & Shafiei, 2013).

Besides, the Malaysian government should make the sustainable and green construction compulsory progressively. For example, by displaying the energy performance rating on building as being done in the United Kingdom (Yellamraju & AP, 2011). Furthermore, the awareness of essential of environmental concern should be elevated. Although most of the roles of the construction industry have cognition about the green construction, but there is still a wide space to stride. The environmental considerations should be integrated into every phrase of the construction projects, and encourages engagement of all team members from the initiate to the completion of the projects (Kamar & Hamid, 2011; Yellamraju & AP, 2011).

In additional, to implement sustainable and green construction in Malaysia, government and capable private organizations should make technology transfer from developed countries, such as: Singapore since our climate and surrounding the situation is almost same. Indeed, invites the talented person from developed country is another good practice. They might introduce new concepts and ideas to boost up our progress in sustainable and green construction.

Everyone in the country should be educated about the significance of sustainable and green construction. Not only in higher education organization, but should introduce since primary schools. Besides raising the awareness, it is also shown our desire to popularize the green construction practices.

Undoubtable, research and innovation is the greatest method to multiply the acquaintance. Malaysian government has set an amount of allocation to accelerate research and development. The universities' academicians are encouraged to propose research in sustainable construction industry (Nazirah Zainul, 2010). They should utilize this opportunity to do more research and innovation to stimulate the green and sustainable construction practices.

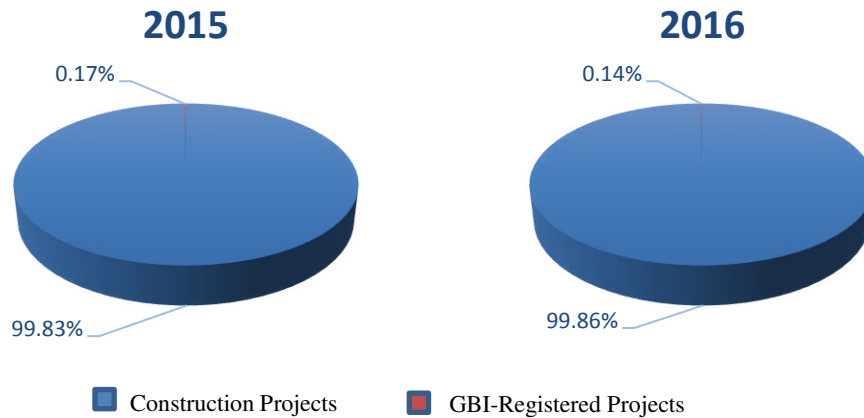


Figure 5
The confrontation of GBI-registered projects and construction projects

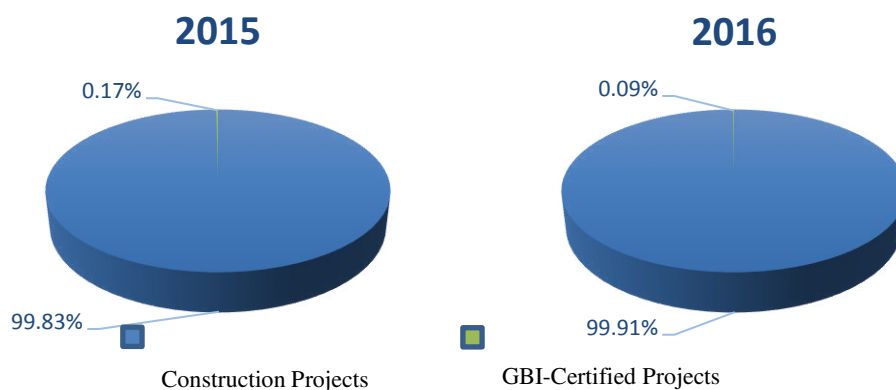


Figure 6:
The confrontation of GBI-certified projects and construction projects

As summarized, the awareness of green and sustainable construction among contractors in Malaysia is not universalized. The outcome of this research revealed that the number of GBI-registered and certified projects are appalling and the authorities should rectify this problems as soon as possible. The collaboration among government and private industry is eventful to stimulate the practices of green and sustainable construction. The environmental problems caused by construction are unrecoverable and might endanger mother earth's tomorrow. By practicing green and sustainable construction, the sustainable balance between economic, social and ecologic can be achieved. Therefore, the welfare of human beings and the environment can be taken care of.

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