GREEN MANAGEMET

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MALAYSIAN GREEN BUILDING INDEX (GBI) AND ITS APPLICATION FOR GREEN MOSQUES: THE LITERATURE REVIEW

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Abstract - Malaysia has undergone over 50 years of rapid industrialisation, recording 5% to 9% of Growth Domestic Product (GDP) growth annually. The industrialisation has sprawled from urban areas to rural areas, giving more prosperous economic development. Unfortunately, most of the development has been unsustainable and there is a need for a holistic move towards sustainable approaches for the development, especially for the public building, like mosque. Simultaneously, Malaysian Green Building Index (GBI) is created to support these sustainable approaches for mosque. However, there are limitations on the green element's application especially for existing mosques, since there is typical mindset from the building owners that the GBI application procedures is hinder with complicated procedures. This paper will explore the literature review of the relationship between Malaysian Green Building Index (GBI) and its Application for Green Mosques in Malaysia.
Keywords **–**Green Building Index, Mosque, Sustainable

1 INTRODUCTION

The Government of Malaysia, under the support of Malaysia Green Building Confederation (MGBC), Minister of Energy, Green Technology and Water, and Public Works Department (PWD) are supportive towards the sustainable initiatives in supporting the Green Building Index (MGBC, 2013), which also leads to a more green effort. To achieves GBI status, the building sectors need to comply and follow the MGBC requirements where all the rating are given based on GBI Tools and as a result the building will be entitled with GBI Award based on the building categories (GBI, 2017a).

However, there are limitations on the green elements application especially for existing buildings, where there are only a few existing buildings rated as a green building compared to the new building. Based on GBI statistical data, at the moment, there are only 16 buildings; which are comprises of 13 non-residence existing building and 3 industrial existing buildings that have been awarded with GBI (GBI, 2018). Most of these buildings are commercial buildings, and there are only a few public or community buildings, like school or mosque have been awarded with GBI rating. Usually, the existing buildings have limitations on the function and technology that affect the process on the GBI application. This is because the technology and design elements of existing buildings are a bit complicated which hinder the process towards achieving green criteria for GBI.

Most of the existing public buildings in Malaysia, like mosque were designed based on the generic physical design from the Malaysia Public Work Department (PWD). These existing designs usually do not meet the standard of GBI. As example for mosque in Malaysia, even though there are more than 6,329 mosques in Malaysia (JAKIM, 2016) which are monitored by Majlis Agama Negeri, only a few meets the green criteria. It is a challenge for government of Malaysia to retrofit these mosques to meet the green parameters. It is important to meet the green standard due to the energy-efficiency functionality and operational profitability (GBI, 2017b). It is also a great asset to Malaysia if these mosques can be retrofitted to achieve green parameters, especially the famous and prominent mosques such as Masjid Negara and Masjid Putrajaya. It will add the value of these mosques.

2 THE LITERATURE REVIEW

According to Ortiz, Pasqualino & Castells (2010), a building is considered green if the process of creating structures is environmentally responsible and resource-efficient throughout a building's lifecycle from siting to design, construction, operation, maintenance, renovation and deconstruction. Essentially, a building is accredited as green if it managed to get approval from standard rating tools. There are several popular and established rating tools that could be used to rate the greenness of a building, which are; Building Research Establishment Environmental Assessment Method (BREEAM) in The United Kingdom (BREEAM, 2013) and Leadership in Energy & Environmental Design (LEED) in The United States. The main objectives of these green building rating tools are to predict and simulate models of building performance during the building's operational phase.

In Malaysia, the established rating tools is the Green Building Index (GBI), where grades and points are rated for performance above benchmarks and current industry practice, while the buildings will be awarded one of four types of ratings: Certified, Silver, Gold and Platinum depending on the scores achieved (GBI, 2019). Zuo & Zhao, (2014a) stated that to measure the characteristics of green buildings by following the GBI ratings, the 6 characteristics rating tools are energy efficiency (EE), water efficiency (WE), material resources (MR), indoor environment quality (EQ), sustainable site planning and management(SM) and innovation (IN).

2.1 Development and Evolution of Green Mosque with GBI

Many researches and development have been carried out to improve building performance through energy sustainability and 'green' design or architecture (Atsa, 2015a). As for the Green Building Index (GBI) in Malaysia, it is starting to gain awareness at local level amongst the building industry players, professional sectors, and the public. They believe that the benefits and impacts that a green building could bring to the environment are sought after and there are genuine demands coming from the public (Siang, 2017).

The fact that Malaysia is a Muslim majority country, one of the most prominent structures that could be easily found in Malaysia is the mosque. As pointed out by Omer (2010), the institution of mosque will continue to act as a social core; this is because the concept of Islam and mosque as its central institution is to guide the Muslim communities toward their complete way of life. The timelessness of mosque institution demands that reinterpretation of its activities and architecture to match the needs of modern Muslim societies, hence it is crucially significant for a study to be done regarding the incorporation of GBI elements in mosque (Utaberta, Asif & Hamzah, 2016).

By using suitable green design approaches which accommodate people's need for religious activity whilst reducing the carbon footprints, detail analysis on the environment with proposal of passive design strategies that allow to reduce energy consumption can be prolong to many mosques in Malaysia (Bauer, 2010). With the environmentally design techniques for mosque; which present moderate use of materials, energy and space, the green criteria must be obtainable in the modern mosque design for the benefit of the Muslim society (Nangkulautaberta, 2011).

"*Green practices were not new as we think, it is because during pre-1990s mosque were built with no air-condition but with good and effective cross ventilation*" (Azim A, 2016a). Azim also added "*in some surau in village, rainwater is collected in containers that are used for washing before prayers*" (2016b). These classic practices are still linked to green practices that are still adaptable to many mosques in Malaysia. Furthermore, the rise of green mosque will gives benefit to mosque management especially in terms of energy wastage and management by the introduction of energy efficiency and water efficiency (Zhin, 2006). This is related with the parameters indicated in GBI rating tools.

The appraisal of energy consumption patterns and recognition of energy saving measures are most vital in energy management activities (Sapar & Siew, 2005) and for mosques, this item is measurable since the duration of energy usage is easily predicted. Most mosques use higher consumption of electricity during the 5 times of prayers' time. Therefore, the mosque's management has access to reduce the energy consumption during other time. This strategy is related with GBI parameter rating tools which is energy efficiency (EE). A wise use of energy is a key factor to make sure a sustainable industry development (Apeaning, & Thollander, 2013).

At the moment, in Malaysia, there are only 3 mosques considered as Green Building and fulfil the requirement of GBI (GBI, 2018). However, all of these mosques are newly-built mosque like Fisabilillah Mosque in Cyberjaya (Platinum Award), Ara Damansara Mosque in Damansara (Gold Award) and Section 13 Mosque in Shah Alam (Certified), (GBI, 2018). According to Tourism Malaysia (2016a), 26.8 million tourists and visitors came to Malaysia for vacation purposes and visited mosque, which strongly show that mosque buildings received many visitors and the near future will indicate that the visitors' statistics will increased.

Cyberjaya Mosque, also known as Masjid FiSabilillah, has completed in 2015 with the Platinum award rated mosque, and has been considered the first mosque to comply with the GBI Platinum under categories of Non-Resident New Building (NRNB); with the highest score in GBI rating system (Atsa, 2015b). This mosque can be considered as a benchmark to other mosques on how to construct a sustainable building (mosque) based on its design, material selection, surrounding area, energy efficient elements, and its effective green system with the context of GBI.

Existing well-known mosque, like Masjid Negara in Kuala Lumpur, Masjid Kristal in Terengganu and Masjid Putrajaya are the famous and prominent mosques for the country. It is an exceptional move to Malaysia if these mosques can be retrofitted to meet the green parameters as per GBI standard. By retrofitted existing mosque with GBI standards, it will add an extra attraction to visitors and educate the public users' on how to maintain a sustainable way of life as a Muslim. GBI goal is to reduced impact of human activities on nature and environment including building occupant (GBI, 2018).

3 THE WAY FORWARD

Recently, MGBC presented and certified GBI as the official tools and trusted bodies to measure and classified building itself in Malaysia (GBI, 2017). However, there are no specific rating criteria or guidelines for existing mosque and it is complicated to any parties to have a better understanding and concrete information about the specification and relationship between different of elements, sustainability and suitability for the GBI category of the Non-Residential Existing Building (NREB) for existing mosque.

Issues such as water and energy wastage are perceptible and need to be solved. Therefore, complying with green parameters is necessary to minimise the wastage issues (Tomlinson & Keasey, 2014). In GBI, there are 6 main criteria (rating tools) that can control the issues of resources wastage, which are Energy Efficiency (EE), Indoor Environment Quality (EQ), Sustainable Site Planning & Management (SM), Material and Resources (MR), Water Efficiency (WE), and Innovation (IN). There are many other items can be used to measure the Green Elements such as LEED, BREAM or GREEN MARK and it is depending on which region and how it is fit to the countries' systems (Zuo & Zhao, 2014b).

At the moment, the mosques are only focusing on the function and esthetical values, and is lacking in the green values (Henderson, 2003). Therefore, effort need to be made, to educate the mosque's management and the authorities (for example Jabatan Agama Islam, Jabatan Kebajikan Islam Malaysia (JAKIM)) to understand better on how to establish a greener environment for mosques that can suits green standards (Utaberta, Asif, & Hamzah, 2016). By applying GBI to the existing mosque, it will help the authorities, the management of the mosque and contractors, to solve the issues of resources wastage by upgrading the existing features to make sure they comply with GBI Tools, in terms of energy management, construction and maintenance (GBI, 2017).

There is a gap to be fill in, and the most significant gap is to allow the management to understand the GBI implementation and its benefits to establish greener mosques. The 6 parameters; Energy Efficiency (EE), Indoor Environment Quality (EQ), Sustainable Site Planning & Management (SM), Material and Resources (MR), Water Efficiency (WE), and Innovation (IN); symbolises on how mosques should be greener in the future. The collaboration of knowledge sharing between the Ministry of Energy, Science, Technology, Environment and Climate Change, MGBC and JAKIM is needed to improvise and upgrade the current situation of mosque to be more sustainable, resilient and green for the future (See Figure 1).

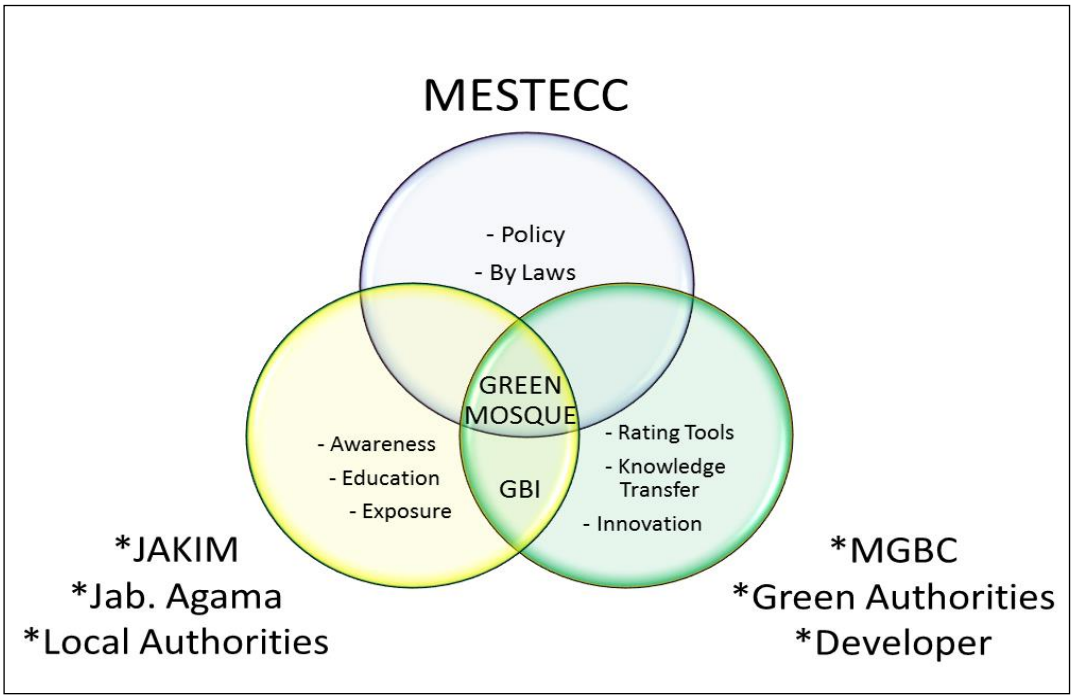

Figure 1 The Way Forward of Collaboration between Agencies to Establish Green Mosques

4 CONCLUSION

Sustainable development is continuously being emphasized all over the world as it results in conscious effort in building construction industry. Based on earlier discussion regarding the advantages and issues for green mosque, the positive impact clearly outweighs the negative impact, hence for the long-term benefit of Muslim user and also toward tourism sector itself. With a holistic approach on how to retrofit the existing mosque, consideration should be given by complying with GBI parameters. It will also add an extra attraction to visitors and public users. The involvement of certain parties especially MGBC with GBI rating, can be seen as consistent with current development trends and as a positive step to preserved nature and environment.

REFERENCES

A.A Aziz, 2016, *Execution Of Contemporary Islamic Architecture Through Design, The Cyberjaya* Green Platinum Mosque Project In Malaysia. Https://Www.Witpress.Com/Secure/Elibrary/Papers/IHA16/IHA16002FU1.Pdf

Apeaning, R., W., Thollander, P., 2013, *Barriers to And Driving Forces For Industrial Energy Efficiency Improvement.*

ATSA Architect, 2015, *Green Buildings- cyberjaya mosque*, Retrieved From http://www.atsa.com.my/green_buildings_cyberjaya_mosque.html on Jun 2018

Bauer, M., 2010, *Green Building-Guide Book for Sustainable Architecture. Heidelberg: Springer.* Capehart, Turner & Kennedy, 1997

Choong Mek Zhin, , 2006, *A Growing Trend; Building 'Green' Becoming More Feasible And Is Cost-Saving*, The Star.

Green Building Index. Malaysia - Green Building Index. *Green Building Index (GBI)*, 2009. Http://New.Greenbuildingindex.Org/Resources. Retrieved From Http://New.Greenbuildingindex.Org/Resources on July 2018

Green Building Index. Malaysia – *GBI News*, July 2017 Retrieved From http://iproperty.com on August 2018

Green Building Index. Malaysia - Green Building Index. *Green Building Index (GBI)*, 2018 Http://New.Greenbuildingindex.Org/organisation/building. Retrieved From http://new.greenbuildingindex.org/organisation/building on July 2018

Green Building Index. Malaysia - Green Building Index. *Green Building Index (GBI)*, 2018 Http://New.Greenbuildingindex.Org/organisation/building. Retrieved From http://new.greenbuildingindex.org/organisation/building August 2018

Henderson JC., 2003, *Managing Tourism And Islam In Peninsular Malaysia*. Tourism Management, 24(4), 447–456

IslamicTourismCentre, 2016. Retrieved From http://www.itc.gov.my/ on August 2018

JAKIM, Department Of Islamic Development Malaysia (JAKIM). *Masjid-Masjid Di Malaysia, Putrajaya,* 2016. Retrieved From Http://Www.Masjid.Islam.Gov.My/Index.Php. 2016 on July 2018

Malaysia Green Building Confideration (MGBC), 2013.http://www.mgbc.org.my/anintroduction/ intheearlydays. Retrieved From http://www.mgbc.org.my/ on August 2018

Nangkulautaberta, 2011, *Re-Interpretation Of Sustainability In Islamic Architecture Critical Analysis Of The Innovation In Temporary Praying Platform Project* (UKM)

Omer, S., 2010 Some Lessons From Prophet Muhammad (SAW) In Architecture: The Prophet's Mosque In Madīnah. *Intellectual Discourse*, *18*(1 SE-Articles),. Retrieved From Http://Journals.Iium.Edu.My/Intdiscourse/Index.Php/Islam/Article/View/140

Ortiz, O.; Pasqualino, J.C.; Castells, F. Environmental Performance Of Construction Waste: Comparing Three Scenarios From A Case Study In Catalonia, Spain. *Waste Manag.* **2010**, *30*, 646–654.

Sapar And Siew, *Energy Efficiency Running Costs*, 2005.

Tai Lee Siang, GBI News, *Accelerated Growth and WGBC Taking A Lead Role*, 2017, Retrieved From http://iproperty.com on August 2018

Tomlinson-Keasey, 2014

Tourism Malaysia, 2016, Retrieved From https://www.tourism.gov.my/ on August 2018

Utaberta, N., Asif, N., & Hamzah, Z, 2016. Evaluating Possible Innovative And Sustainable Approach Of Mosque In Contemporary World. *Journal Of Design + Built*, *9*.

Zuo, J.; Zhao, Z.Y. 2014, *Green building research–current status and future agenda*: A review.Renew. Sustain. Energy Rev., 30, 271–281.