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Eco-Mosque: Overview, Potential and Challenges of Implementation in Malaysia

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Abstract
The crisis of deterioration of environmental quality and the issue of global warming which is increasingly critical today as a result of human greed to pollute the environment have invited many problems to human life. Thus, the management and conservation of the environment based on the Islamic approach is gaining attention both nationally and internationally. Apart from highlighting the Islamic approach, the empowerment of religious institutions such as mosques has also received attention from various parties. As an example, creating an eco-mosque and expanding its role as an environmental conservation agent in an effort to spread and promote the message of environmental awareness to the community. Although the implementation of eco-mosques in Malaysia is still not widespread, efforts to transform the existing mosques into eco-mosques are already in place. Therefore, this article presents an overview of the concept of eco-mosque and outlines in general the potential and challenges

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of eco-mosque implementation in Malaysia. It was found that one of the main challenges in the implementation of eco-mosques is the large cost of implications as well as the willingness of community members in its successful implementation

Keywords
Eco-mosque, Islamic approach, environmental conservation, environmental awareness.

Introduction

By definition, a mosque is a place of prostration or worship[1] such as prayers and *i'ktikāf*[2] for Muslims.[3] The function of the mosque is not limited to performing special worship alone, but instead serves as a cultural centre[4], *mu'āmalat*, development of Islamic missionary and also a centre of activities of Muslims.

In this context, history has shown that the mosque has played a diverse role for centuries from the era of the Messenger of Allah. It was found that Prophet Muhammad SAW not only made the mosque as a centre of worship, but it was also used as the centre of government and administration of the Islamic State of Madinah. The mosque built by Prophet Muhammad SAW for the first time in Madinah was used as a model of environmentally sustainable practices.[5] During his leadership,

1. Kamus Dewan Edisi Keempat (Kuala Lumpur: Dewan Bahasa dan Pustaka, 2007).
2. Originally it comes from "*'akafa*" to mean to remain uninterruptedly; to seclude, to isolate, see Hans Wehr s.v. "*'akafa*". Technically, it is an Islamic practice where one isolates oneself by staying in a mosque for a period of time, devoting oneself to worship and abstaining from the worldly activities. It is highly commendable to do it particularly during the last ten days of Ramadan.
3. Ayob M., "*Manajeman Masjid Petunjuk Praktis bagi Para Pengurus*," (Jakarta: Gema Insani,1996).
4. Faqih P., Prijotomo M., Sulistyowati J. & Setijanti M.,*Tipologi Arsitektur Masjid-Tanpa Arsitek* (Surabaya: Lembaga Penelitian,1992).
5. Spahic Omer, "Some Lessons from Prophet Muhammad (SAW) in Architecture: The Prophet's Mosque in Madinah," *Intellect Discourse* 18 (1): 115.

the Prophet's Mosque became the centre of Islamic movement that mobilised community activities and also for the people to claim rights and justice.

In addition, the Prophet's Mosque also played an important role as a centre of virtue and knowledge, besides being the centre of the relationship between man and the Creator God Almighty and also among human beings. The Prophet SAW successfully highlighted the perfection and beauty of Islam as *an al-Dīn* (way of life) through comprehensive functions it conducted.

This should be a good example to the leadership of the mosque institution (preacher and mosque committee) today by placing the mosque not only as a place solely for prayers, but also as an institution that has a wider role and can be developed as a centre for spreading the teachings of Islam from every aspect of the spiritual life of the community, including the context of environmental sustainability. This is a good example of putting the green concept in the mosque environment and green practice. This article intends to draw attention to the eco-mosque (or eco-friendly mosque) or also referred to as the green mosque, and its implementation that can help in environmental conservation.

There are two main aspects of the eco-mosque concept namely the commitment of the mosque management to transform the system, management and facilities of the mosque towards green living practices. The second aspect is the support and involvement of the community to succeed in the green initiatives implemented by the management of the mosque which will indirectly enliven the mosque. This article consists of five sections. The first section explains the concept of the eco-mosque in general. The second presents about the first eco-mosque in Malaysia, its characteristics and approaches in general. The third section highlights in general about the need for mosques to be made as pioneers of green practices and how, as Islamic institution, it should function to educate society in the aspect of environment conservation. The fourth explains the potential of eco-mosque Implementation in Malaysia, while the final section discusses the challenges in expanding the implementation of

eco-mosques in Malaysia. The final section also includes the challenges faced by other countries in the application of green technology and green practices.

The Concept of Eco-Mosque

The concept of the eco-mosque is derived from two words namely "eco" and "mosque". "Eco" is derived from the word "ecology" which is a terminology closely related to an ecosystem, and it is a system formed by the interrelationships between the diversity of life and also the environment in which it inhabits. The term "mosque" from the context of shara' (Islamic law) is a place for prayers and performing related Islamic rituals.[6] From this concept, it can be understood that, "eco-mosque" is defined as a place of worship that pays attention to the continuity of the relationship between all components of life and the environment by focusing on the management of the mosque which includes three main aspects namely *idārah* (managing), *imārah* (prosperity activities), and *ri'āyah* (maintenance and facilities).[7] Thus, the eco-mosque is a multi-functional community centre located in a strategic location, easily accessible, environmentally friendly, supporting local businesses, enhancing social interaction and knowledge exploration.[8]

The eco-mosque or green mosque is one that emphasises aspects of environmental monitoring and preservation. It considers the local microclimate in building design, using local materials, respecting the surrounding environment, reducing negative impacts on quality of life and the environment and providing a comfortable environment to users. It is considered to

6. Kamus Dewan, (Kuala Lumpur: Dewan Bahasa dan Pustaka, 2005).
7. Eka Rahmat Hidayat, Hasim Danuri & Yanuar Purwanto, "Eco-Masjid: The First Milestone of Sustainable Mosque in Indonesia," *Journal of Islamic Architecture* 2018: 5 (1): 20-26.
8. Siti Syamimi Omar, Nur Hanim Illias, Mohd Zulhaili Teh & Ruwaidah Borhan, "Green Mosque: A Living Nexus," *Environment-Behaviour Proceedings Journal* 3 (7): 53-63.

have green features or conform to eco-friendly aspects in the spirit of management responsibilities given by Allah.[9] More clearly to be easily understood, the eco-mosque refers to a condition in which the implemented practices can minimise or avoid harm to the environment. Therefore, mosques that conform to the concept of the eco-mosque are developed in a safe environment and also promote aspects of protection of the ecology and the environment to ensure environmental sustainability.[10]

There are several initiatives of the eco-mosque (green mosque) concept needed to be taken in a country. Firstly, in the construction of a new mosque, the architectural plan of the mosque must be designed by a professional architect and agreed upon by the authorities. To ensure an eco-friendly environment, it must take into account the interests of all parties—both the congregation and the local community.[11] Among the main features of green buildings or ecological buildings is that they do not disturb the ecological balance. It is found that there are many man-made factors that disrupt the ecological and environmental balance today. Therefore, awareness of the construction of buildings that are characterised by environmentally friendly design is very important. This is to ensure that a mosque building benefits not only the environment, but also human beings. Green buildings refer to structures and implementation of environmentally-responsible and resource-efficient processes over the life of a building. This starts from the design planning, construction, operation, maintenance, renovation until its demolition. In general, ecological buildings that belong to a group known as sustainable architecture are made from materials that produce their own energy, using natural and renewable energy sources, contain fewer toxic materials

9. Siti Syamimi Omar et al. "Green Mosque".
10. Obaidullah, M, "Eco-Friendly Mosque: A Concept to Reality" (2019). http://researchgate.net/publication/337257071_The_Concept-of_Eco-Friendly_Mosque (accessed 5th. March, 2020).
11. Ibid.

or are obtained from recycled materials.[12] The main feature of such buildings is that they are less harmful to the environment by using technological facilities.[13]

Secondly, several aspects such as the design of the roof, doors and windows of the mosque need to be carefully planned to ensure the use of natural light during the day to reduce the use of electricity and other energy sources. The use of solar panels in mosques also can be considered to reduce electricity consumption. Such a design is intended to ensure low carbon emissions can be achieved.[14] Next, to ensure an eco-friendly environment, green activities are a must. Suitable and useful green trees can be planted on the roof of the mosque complex, front space, the space outside the windows and in other parts around the mosque area. It can create a beautiful and enchanting environment and presents the Islamic concept of a garden in paradise. Allah says which means:

> As for those who obey Allah and His Messenger, We will admit them into Gardens with rivers flowing under them, remaining in them timelessly, forever. That is the Great Victory."[15] Allah says again which means: "Indeed, those who have believed and done righteous deeds— they will have the Gardens of Paradise as a lodging, wherein they abide eternally. They will not desire from it any transfer.[16]

This is also a Sunnah practice. The Prophet SAW said:

"*There is no Muslim who plants a tree or sows a field for a human, bird, or animal eats from it, but it shall be reckoned as charity from him*."[17]

12. Green Building Index. https://www.greenbuildingindex.org/(accessed 15th. September, 2021).
13. H. Derya Arslan, "Ecological Design Approaches in Mosque Architecture," *International Journal of Scientific & Engineering Research* 10 (12): 1374-1377.
14. Obaidullah, "Eco-Friendly Mosque".
15. *Ali Imran* (3): 13.
16. *Al-Kahf* (18): 107 –108.
17. *Sahih al-Bukhari*, no. 2320.

Finally, the construction of the mosque building should also be designed to harvest rainwater which in turn can be used for many other beneficial purposes.[18]

The First Eco-Mosque in Malaysia

The implementation of eco-mosques in Malaysia is rather delayed compared to neighbouring country, Indonesia, which is more advanced in transforming the mosques there into eco-mosques. However, efforts towards the implementation of the green concept on some mosques in Malaysia are already in place. For example, the Raja Haji Fi Sabilillah Mosque in Cyberjaya, Sepang, Selangor became the first mosque in Malaysia to receive a Green Building Index (GBI) certificate with a platinum rating. The mosque began construction on March 18, 2013 on 6.8 hectares of land, and was completed on January 19, 2015.[19]

The design of the Raja Haji Fi Sabilillah Mosque is a progressively planned modern mosque with the symbolic use of contemporary Islamic facade design. Its main concern is to build a sustainable building that portrays Islam as a progressive religion using simplicity and purity in its design.[20] The mosque building was built in accordance with the green concept in various aspects, including all the facilities that complement the mosque. The glass dome housed on the roof of the main prayer hall uses two low beam (LE) glass panels pressed with ceramic carvings that serve not only to beautify the mosque's construction, but also to block direct sunlight. Hot air will come out through a ventilator under the top of the dome which removes the trapped

18. Obaidullah, "Eco-Friendly Mosque".
19. Nor Hanisah Kamaruzaman, "Masjid 'Hijau' Pertama di Malaysia," *Harian Metro* 14 Julai, 2017 (accessed 17th. April, 2020).
20. A. A. Aziz, "Execution of Contemporary Islamic Architecture Through Design: the Cyberjaya Green Platinum Mosque Project in Malaysia," *Proceedings of the 1st International Conference on Islamic Heritage Architecture and Art* (IHA 2016). https://www.witpress.com/elibrary/wit-transactions-on-the-built-environment/159/35391 (accessed 6th. October, 2021).

air and reduces the temperature in the main prayer hall. The temperature in the area inside the prayer hall is expected to be only around 26 degrees Celsius with the help of a fan. The low-energy air conditioning system is designed for use for about two hours during Friday prayers, Eid prayers as well as celebration events such as Ramadan.[21]

Apart from being equipped with attractive architecture, the mosque also makes energy efficiency as the main core by using natural lighting and ventilation. The construction of the mosque adopts a natural ventilation system despite having air conditioning which is usually only used during Friday prayers in the main prayer hall. Geometric carvings on the roof and walls of the mosque building not only help the natural ventilation process, but also facilitate sunlight to penetrate into the building. Meanwhile, a pool of water around the main prayer hall is used to create a natural water mist when blown by air. [22]

The mosque, which was built at a cost of RM44.3 million, also saves electricity in its lighting, where LED lights are used throughout the building to reduce electricity consumption. In addition, the lights are not turned on all night. Instead it is controlled using a movement sensor. Apart from that, the mosque also has a building management system that controls all electrical and mechanical systems such as the use and temperature of air conditioners. The mosque also utilises rainwater as proof of efficiency in its water resources management, which reduces the use of clean water supplied by state water companies by storing rainwater before it is used for some purposes.[23] The mosque also collects excess water for ablution for the purpose of watering trees around it.[24] The use of rainwater can save as much as 70 per cent in water bill expenses. The rainwater system in the mosque

21. Mona Ahmad, "Masjid Cyberjaya berteknologi hijau pertama negara," *Berita Harian* 24 March, 2015 (accessed 17th. April, 2020).
22. Nor Hanisah Kamaruzaman, "Masjid 'Hijau' Pertama di Malaysia."
23. Ibid.
24. Mona Ahmad, "Masjid Cyberjaya berteknologi hijau pertama negara".

is supplied for watering the landscape around the mosque as well as used for toilet needs. The mosque is the first to use solar panels to generate electricity.[25] It features solar panels on the roof level that not only reduces direct sunlight, but also saves electricity costs. The energy generated from these solar panels is sold to Tenaga Nasional Berhad and it is able to generate mosque income of up to RM5,000 per month. In addition, the solar panel with a size of 350 square metres is also capable of generating energy with a capacity of 48 kilowatts per peak.[26] Indeed, the Raja Haji Fi Sabilillah Mosque can be used as a model building that meets the Green Building Standards (GBI) due to the use of recycled materials and energy-saving equipment which reduce the various costs that go into maintaining it. It can be used as a guiding model for other mosques in Malaysia in transforming the concept of eco-mosques both in terms of mosque design modifications as well as improvements on all existing facilities in an effort to move towards the application of green practices as a whole.

The Need for Mosques to Propogate Green Practices

The term green *dīn* (green religion) is used to refer to the relationship between Islam and the concept of greening. There are six principles of the green *dīn* that have been proposed by Ibrahim Abdul-Matin to be embraced by every Muslim. The first principle is monotheism, which is to believe in Allah, the One and only True God; secondly, observing the signs of the Greatness and Power of Allah; thirdly, man is the caliph; fourth, the trust of caring for nature; fifth, adhering to the principles of justice and finally the sixth, maintaining an ecosystem balance.[27] The six principles of green dīn can be applied in shaping the

25. Ibid.
26. Nor Hanisah Kamaruzaman, "Masjid 'Hijau' Pertama di Malaysia".
27. Ibrahim Abdul-Matin, *Green Deen: What Islam Teaches about Protecting the Planet*, (San Francisco: Berret-Koehler Publishers, 2010).

mosque with the concept of greening, further justifies the selection and use of the term "eco-mosque" or "green mosque" in the context of this article .

At a time when the world is going through such a critical global climate change crisis, mosques need to be important institutions that set a good example towards sustainable development and the cultivating of green practices that can help in reducing global warming. Islam should be seen beyond specific acts of worship such as prayers, rather the spirit of Islam includes helping to preserve the environment. Religion serves as a milestone for promoting awareness in protecting the environment, such as in conservation practices.[28]

The institution of the mosque should function as a place that promotes all forms of efforts to preserve the environment. The existence of the religion symbolised by the mosque is part of the interaction of Muslims. Meetings between individuals with different beliefs provide an opportunity for them to conduct dialogues with each other and then together to translate the religious message into practical form. This is done as a form of necessity and it requires that religious beliefs must go hand in hand with its adherents. Therefore, religion should not be in purely abstract and conceptual norms or beliefs only, instead it should be manifested in daily lives and one of them is through protecting the environment.[29]

The functions of mosques in Malaysia appear to be more focused on specific worship only, and its function and role in preserving the environment seem to be non-existent. Whereas, Islam and the environment cannot be separated because Islam itself emphasises human relationship with the environment.

The potential of the institution of worship should be unlimited. It should be used as much as possible to further

28. Ismail Suardi Wekke et al. "Environmental Conservation of Muslim Minorities in Raja Ampat: Sasi, Mosques and Customs," *IOP Conference Series: Earth and Environmental Science* 156 (012038).
29. Ibid.

develop a positive community attitude and awareness for the environment. If such a potential is ignored, it will be a great loss for Muslims, and will even open up space for a negative response to Islamic institutions that should emphasise the protection of the environment as part of the religious obligation. Moreover, if mosques are developed and integrated with the concept of greening, then members of the community also will have the opportunity to understand their role in the environment in the context of the spiritual which at once act as a driver of the green strategy.[30]

Islam recognises the existence of the environment so much so that it is considered as a component in the objective or purpose of the Shariah (*maqāṣid al-shari'ah*). In Islam, there is the term "five basic necessities" (*al-ḍarurah al-khamsah*) which is an important principle in human life and must be taken care of by every Muslim to ensure the well-being and rights of the *ummah* from any form of threat and damage. *Al-ḍarurah al-khamsah* also covers aspects of preservation and conservation of the environment. Individuals need to be aware that preserving and conserving the environment is like preserving religion, soul (life), descendants, mind and property.[31]

The five benefits associated with the care of the environment are closely related to the faith, worship and moral of the Muslim. This means, if a person does damage to the environment, then he is like damaging his testimony (*al-shahādah*) and his agreement with Allah to do all of His commands and abandon all of His prohibitions while displaying bad morals and ethics to other individuals. Therefore, one of the efforts the mosque can undertake is to unite the local community which consists of various backgrounds to create a mosque environment with the concept of greening as a centre for the

30. Abd. Aziz Rekan, Tengku Sarina Aini Tengku Kassim & Yusmini Md Yusuff, "Peranan Konsep 'Surau Hijau' dalam Membentuk Komuniti Lestari di Sekolah," *Akademia* 89 (3), October 2019: 99-112.

31. Abu Bakar Yang, *Pengurusan dan Pemeliharaan Alam Sekitar dari Perspektif Islam* (Kuala Lumpur: Institut Kefahaman Islam Malaysia, 2015).

development of knowledge and sustainable culture collectively. The content of the concept should be highlighted so that the local community, especially Muslims, have the opportunity to experience interacting with the elements of the environment through the role of the mosque with the concept of greening.

The use of the terms "green" and "greening" is symbolic to the application of elements of environmental sustainability in the formation of a concept. For example, the concept of the production of green products needs to consider the principle of material selection which can be recycled and materials that can be decomposed by microorganisms (biodegradable) to reduce the negative impact on the environment. In fact, the selection of such product materials will also save maintenance costs (economy) if any form of pollution can be curbed.[32]

Furthermore, from the Islamic point of view, the term "green" is described in the Qur'an with the colours of nature such as plants and fruits as Allah says:

> And it is He who sends down rain from the sky, and We produce thereby the growth of all things. We produce from it greenery from which We produce grains arranged in layers. And from the palm trees - of its emerging fruit are clusters hanging low. And [We produce] gardens of grapevines and olives and pomegranates, similar yet varied. Look at [each of] its fruit when it yields and [at] its ripening. Indeed,in that are signs for a people who believe.[33]

The interpretation of the verse gives a picture of the process of creation of plants that is so meticulous and through a gradual process from seed to the production of green plants that produce various types of fruits. In all of these show the Power, Wisdom and Perfection of Allah the Almighty Creator who commands human beings to observe each of His creations,

32. Abd. Aziz Rekan, et al, "Peranan Konsep".
33. *Al-An'am* (6): 99.

from which there are great propositions about His Existence and Oneness . This can only be responded to by believers.[34]

The essence of the teaching from the Quranic verse is implicitly to raise human awareness of the greatness of Allah the Almighty Creator of all and to nurture gratitude for all the blessings that He has bestowed upon. While literally, the verse displays the importance of greening activities such as farming and planting trees that not only benefit humans, but also the creatures in the environment such as animals. The Prophet said: "*It is not a Muslim to plant crops, then the plant is eaten by birds, humans, or animals, except for him with the plant it is charity*."[35]

By applying the true concept of Islam, mosques have always been green. The concept of green or sustainability is based on the ideas meeting the needs of the present without compromising the ability of future generations to meet their own needs. The Prophet SAW teaches us of the responsibility of every human being to maintain and govern not only for ourselves, but also for everyone, both for the present as well as the future. Such a teaching is in line with Islam. Humans are chosen as caliphs by Allah to govern the entire ecological system and are always in correlation with other environmental entities. In this manifestation, Islam divides human interaction into three categories namely interaction with Allah (the Creator), interaction with human beings (environmental entities of the same species) and interactions with the environment (other entities than humans). This shows that the perfection (*al-shumūl*) of Islam depends on the whole interaction between man and the environment.[36]

34. Ahmad Mustafa Al-Maraghiy, *Tafsir Al-Maraghiy*, trans, Muhammad Thalib (Kuala Lumpur. Dewan Bahasa dan Pustaka, 2001)
35. *Sahih al-Bukhari*, no.2320.
36. M.N. Mamat, et al, "Islamic Philosophy on Behaviour-Based Environmental Attitude," *Procedia-Social and Behavioral Sciences* (49) 85-92.

The Potential of Eco-Mosque Implementation in Malaysia

The concept of sustainability practised by mosques is seen to be able to have a positive impact on the environment and the local community to be exposed to green practices while educating them to cultivate green practices in daily life. The potential to transform existing mosques in Malaysia into eco-mosques is seen as wide open when the Ministry of Environment and Water (KASA) also paid attention to the matter when starting the initiative with a target of 10 mosques in Malaysia to mobilise the implementation of the Green Mosque Programme by making the Hasanah Mosque in Bangi, Selangor as a pioneer.[37]

The Green Mosque programme is a step implemented by KASA through its agency, the Malaysia Green Technology and Climate Change Centre (MTGC), to make the mosque functions not only as a place of worship, but also able to contribute to environmental sustainability. Through the programme, there are four main elements that are implemented in the mosque, namely saving electricity and water, waste management and the use of green products. The ten mosques targeted at the initial stage to be involved in the Green Mosque Programme are existing mosques that have already started carrying out sustainability activities to further strengthen their functions and roles in various aspects to fully apply the green concept. Funds for the implementation of the project are largely covered by the mosque itself and MGTC will assist in advisory and supervisory services. Indirectly, the management of the mosque will enjoy a cost reduction with a more efficient management. This ultimately, will benefit all parties.[38]

In the programme, the MGTC has channelled a contribution of RM1,000 to Masjid Hasanah through the

37. Hafiz Ithnin, "Masjid Hijau Perintis Kelestarian," *Harian Metro* 31 Oktober, 2020. (accessed 2nd November, 2020).
38. Ibid.

Wakaf Masjid Hijau initiative as a start-up to fund activities, improve various programmes at the mosque level related to carbon reduction. The concept of the Green Mosque emphasises two main aspects, namely: the commitment of the mosque management to transform the system, management and facilities of the mosque towards green living practices; secondly, emphasises the support and involvement of the community to succeed in the green initiatives that will indirectly engage the mosque.[39]

The mosque started sustainability activities by collecting, recycling materials such as used cooking oil. It also plans to create solar use in 2021. Furthermore, it collaborated with the Department of Lands and Mines in realising the method of using groundwater as a source for ablution in 2017. Through the recycling project, it received good cooperation from the local community who have been placing waste materials according to colour-coded bins. As a result of the total sales of recycled materials, including cooking oil used for the purpose of biodiesel production, the mosque can get a return of up to RM3,000 a month. In terms of groundwater consumption, the mosque can reduce the cost of water bills by more than 50 per cent per month.[40] Clearly, the implementation of the green mosque concept not only helps to preserve the environment, but also the money collected from the green activities implemented can be rolled back for the development of the mosque. The Green Mosque Initiative Programme is seen as a starting point in encouraging and opening up opportunities for other mosques in Malaysia to transform towards the green concept, as well as a medium of environmental sustainability to the community.

39. Ibid.
40. Ibid.

The Challenges in Expanding the Implementation of Eco-Mosques in Malaysia

Sustainable development is to meet current needs without damaging the environment. By doing so, this would not affect the ability of future generations to meet their own needs.[41] The concept of building sustainability particularly focuses on improving the efficiency of resources consumption (such as water) while reducing the adverse implications of buildings on human health and the environment during operation. This can be achieved through better solution efforts, building design, operations, conservation and disposal systems as well as waste management.[42] For this purpose, green technology was introduced as an initiative involving various techniques and exploration of materials that use clean renewable energy without containing harmful elements to health.[43] The Green Building Index certified by the Malaysian government is used to promote sustainability in the built environment and to raise awareness among developers, architects, engineers, planners, designers, builders and the general public.[44]

In implementing green technology, there are a variety of different problems and challenges faced by each country. For example, in the United States, major challenges in the implementation of green technology and green practices are

41. Azizah, N. & Z. Abidin, "Pendekatan Kos Kitaran Hayat (Lcc) ke arah Pembangunan Lestari di Malaysia," *Persidangan Kebangsaan Sains Sosial UNIMAS, Sarawak Malaysia*, 2011.
42. Green Building Index, 2014. "Green Building Index Assessment Criteria for Nreb: Hotel". http://new.greenbuildingindex.org/Files/Resources/GBI%20Tools/GBI%20NREB%20Hotel%20V1.0.pdf. (accessed January 24, 2021).
43. K.A. Bakar, M.F.M. Sam, M.N.H. Tahir, I. Rajiani & N. Muslan, "Green Technology Compliance in Malaysia for Sustainable Business Development," *Journal of Global Management* 2 (11): 55-65.
44. Nuri, A., "Penilaian Tahap Retrofit Bangunan Sekolah Sedia ada dan Persepsi Pengguna Terhadap Indeks Bangunan Hijau," (B.A. thesis, Universiti Teknologi Malaysia, 2010).

lack of knowledge and awareness, misinformation,[45] expensive eco-friendly products, lack of commitment and less stringent environmental regulations.[46] Meanwhile, in the United Kingdom, the challenge of implementing green technology and green practices is due to financial problems,[47] the lack of guidelines and information.[48] In Sweden, the constraints on the implementation of green technology and green practices are due to the lack of administrative resources, expensive product and service costs and public officials often avoid the use of environmental criteria in decision-making.[49] In China, the constraint on the implementation of green technology and green practices are due to the lack of appropriate administrative and economic methods.[50]

Meanwhile, in Malaysia, the challenges of applying green technology and green practices are the lack of awareness, knowledge and tools in identifying green products as well as insufficient level of awareness, systems and laws.[51] Looking at the challenges faced by countries in the application of green technology and green practices, including Malaysia, it gives the impression that the implementation of eco-mosques will certainly

45. F.A. Fischer,. "Green Procurement: Overview and Issues for Congress," *Congressional Research Service (CRS) Report for Congress*, 2010
46. H. Min, & W.P. Galle, "Green Purchasing Practices of US Firms." *International Journal of Production and Operation Management*, 21(9):1222-1238.
47. Walker, H & S. Brammer, "Sustainable Procurement in the UK Public Sector," *Supply Chain Management: An International Journal 2009*: 14 (2): 128-137.
48. P.A. Gunther, "Hurdles in Green Purchasing-Method, Findings and Discussion of the Hurdle Analysis," in *Buying into the Environment: Experiences, Opportunities and Potential for Eco Procurement*, ed. C. Erdmenger (London: Routledge, 2003).
49. L. Carlsson, & F. Waara, "Environmental Concerns in Swedish Local Government Procurement," in *Advancing Public Procurement*, eds. Thai, KV. & Piga, G. (Boca Raton: Academics Press, 2006)
50. Qiao, Y. & C. Wang, "China Green Public Procurement Program: Issues and Challenges in its Implementation," 2010. In *Proceedings of the 4th International Public Procurement Conference*, 2: 1034-1045.
51. K.N. Adham, C. Siwar, "Perolehan Kerajaan sebagai alat melindungi alam sekitar: Satu pendekatan lestari," *INTAN Management Journal* 2012.

demand great challenges. However, efforts to transform the existing mosques in Malaysia should not be stunted. Rather, all issues and challenges that arise in transforming existing mosques into eco-mosques need to be addressed well so that the goal of environmental sustainability through the full role of mosques can be realised successfully.

Conclusion

Implementing and transforming mosques in Malaysia into eco-mosques is not an easy task. In fact, it demands a lot of things to be refined especially in the face of the challenges that exist. Although the implementation of eco-mosques requires high start-up costs, it should not be a hindrance. On the other hand, the long-term benefits resulting from the implementation of eco-mosques need to be taken into account especially in terms of employment management efficiency which saves a lot of cost and also great benefits to environmental sustainability that will be passed on to future generations. In addition, the implementation of eco-mosque will be a benchmark that can give Islam a good image as a model religion that provides the best guidance to human beings in managing the procedures of daily life and also aspects of environmental management and conservation. To ensure that the implementation of the eco-mosque can be expanded and realised successfully, support from the ministry, government bodies, non-governmental organisations, mosque committees and the general public is very important. This is because, the commitment from all parties will be decisive in the continued implementation of the eco-mosque.

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