



# Constraints in Implementation of Green Building Projects in Malaysia: A Short Review

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DOI: <https://doi.org/10.30880/emait.2023.04.02.003>

Received 22 June 2023; Accepted 13 December 2023; Available online 31 December 2023

**Abstract:** Green building (GB) is the foundation of sustainable construction and a part of promoting environmental conservation. Bringing change to the building construction industry requires multiple efforts from various angles especially to overcome any resistances in the form of technology, human aspects, financial and resources. The transition from conventional to sustainable approach consumes time as it requires changes from different facets in the industry ranging from individual, organizational to industry level. In Malaysia, there are various efforts to bring green into the industry but the progress is low moderate. The current review identified the major constraints that hinder a faster progress for green buildings development in Malaysia which include high initial cost, lack of knowledge and awareness among public and industry players, challenges in technology and expertise as well as lack of government enforcement and incentives. The outcomes of this paper will assist in enhancing and improving the sustainable practice in Malaysian's construction industry for the betterment of life for sustainable communities.

**Keywords:** Green building, sustainable building, environmental conservation

## 1. Introduction

The concept of green building entails the implementation of environmentally conscious and resource-efficient practices throughout the whole life-cycle of a building, encompassing various stages such as site selection, design, construction, operation, maintenance, renovation, and ultimately, deconstruction. This particular practice serves to enhance and supplement the traditional considerations of economy, usability, durability, and comfort in building design. Green building, sometimes referred to as sustainable or high-performance building, is a term used to describe a construction approach that prioritizes environmental responsibility and resource efficiency.

Investment in green building projects is not new in Malaysia. Apparently, in current years, it is perceived as high demand in the construction sector due to its well-recognized advantages not only limited to commercial benefits but also towards the environment and social aspects. The implementation of green buildings necessitates the adoption of a comprehensive framework that encompasses all constituent elements and stages of the construction process. Green buildings are designed to minimize their impact in broader environment, its habitants and surrounding community, energy, and water efficient, sited to retain and take advantage of existing trees and transportation options, as well as uses materials that are recycled, recyclable and non-toxic [1]. Esa *et al.* opined that integration of green building practices into the construction of state buildings and housing results in solid financial benefit, including lower energy, waste disposal, and water costs, lower environmental and emissions costs, lower operations and maintenance costs, and

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savings from increased productivity and health [2]. These benefits range from being fairly predictable-energy, waste, and water savings; to relatively uncertain -productivity/health benefits. Energy and water savings can be predicted with reasonable precision, measured, and monitored over time.

However, despite the spur of advantages brought by the green concept, the shift towards more sustainable practices still lags in Malaysia due to a few key challenges. Zainul Abidin *et al.* pointed out that the green movement in Malaysia is still in its infancy as the construction players are still trying to understand the benefits of sustainable practice [3]. The conventional way of construction has been standing firm for decades. The transition from a conventional to sustainable approach will consume time as it requires changes from different facet in the industry ranging from individual, organizational to industry level. Moreover, there are arguments within the construction industry about whether or not green-rated buildings are actually outperforming their non-green counterparts. There are evidences claiming that green buildings are experiencing discrepancies between predicted and actual performance, especially in regard to energy performance, causing pressure on the practitioners to take accountability and increase their efforts to respond to this matter [4]. The other challenges affecting the implementation of green building are the low level of education, knowledge, and experience of potential buyers on green design and technology, which results in low demand for high-priced green buildings [5]. Thus, it is noteworthy to identify the challenges and barriers that contribute to the lack of implementation of green building practices in Malaysia. By knowing what would instigate faster transformation and understanding on current hindrances, future action can be focused on strategically promoting green applications at more significant level.

## 2. Literature Review

### 2.1 High Initial Cost

As part of the green building factor, capital expenditures for energy efficiency in buildings are frequently the greatest obstacle to constructing high-performance structures that conserve energy. Many developers are concerned that adopting green features into their buildings will involve high upfront costs. Compared to conventional buildings, green building projects are often perceived as having higher initial design and construction costs. The data presented in Fig.1, as studied by Mohd Nordin *et al.*, agreed to the fact that the cost factor (22%) is the most commonly cited barrier that leads to low level of the implementation of green home development [5]. The findings align with a survey of more than 400,000 architects, engineers, and contractors conducted by McGraw-Hill Construction (2006), which indicated that higher initial costs is the greatest obstacle rooting developers' decision to go green.

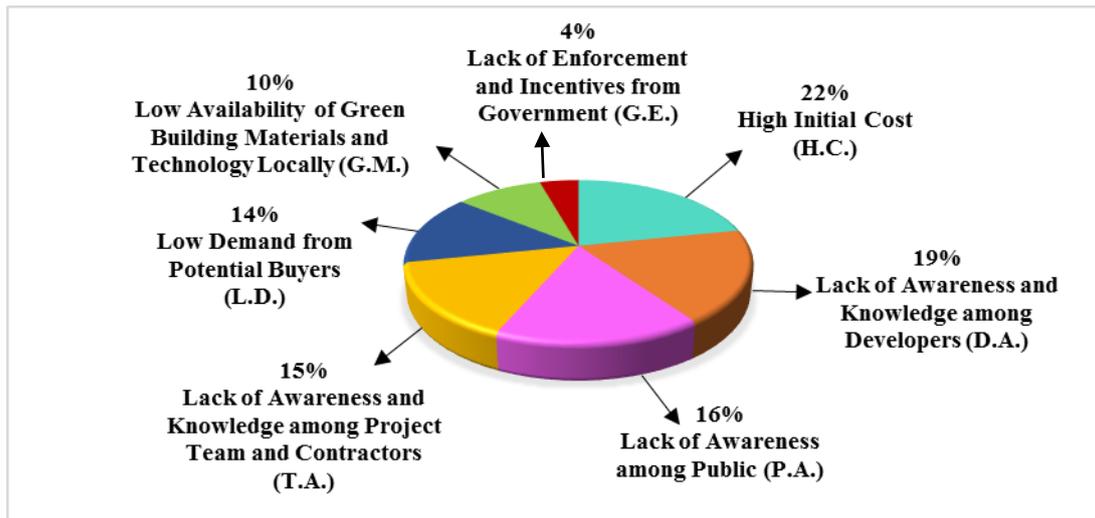


Fig. 1 - Challenges in the implementation of green home development [5]

Qian *et al.* highlighted that there are many uncertainties in the process of delivery of green buildings, such as greater capital costs, new information, new technology, financial risks, risk of delay with government approvals, and so forth which requires a high contingency sum in the project budget [6]. Without a well-informed picture of benefits and costs, the comparably higher initial costs and transaction costs (TCs) with their associated extra risks still discourage potential stakeholders from voluntarily entering the green buildings market.

From another perspective, Robichaud and Anantamula opined that difficulties in hiring an integrated design team early in the green building project, as well as the requirement of green rating assessment, design, and professional fees may also create stumbling blocks that increase upfront cost in green buildings projects [7]. Mohd Nordin *et al.* reported that the higher level of green certification means the higher cost to be incurred (up to 30%) for mechanical and electrical equipment installed to achieve energy and water efficiency [5]. The savings gained despite the reduction in

operating cost with the green building concept seem not worth for the developer company. However, Nalewaik & Venters suggested that in the near decade, manufactured costs for components installed in green buildings may have reduced, progress continues in building technology advancement, product reliability is improving, and lower pricing is becoming a reality in the marketplace [8]. According to Robichaud & Anantatmula, green buildings are expected to decrease operating costs between 8–9%, increase total building value by about 7.5% and increase occupancy rates by 3.5% [7]. As green buildings become more accepted, it is reasonable to expect that component aspects of green design will gradually be absorbed into everyday construction practices.

## 2.2 Lack of Awareness and Knowledge Among Public and Industry Players

The low level of awareness and knowledge is an obstacle that must be surmounted in creating a capable and viable local construction sector. There is a mutual agreement among practitioners and academics that the adoption of sustainability principles is not yet pervasive across industries in Malaysia. Additionally, a significant portion of the Malaysian population remains uninformed about sustainability concerns, indicating a lack of readiness to embrace and incorporate environmentally conscious practices into their daily lives [5], [9]. On the other hand, in terms of knowledge of existing green technologies, some people might have recognized the necessity to implement green buildings but lack the knowledge of which technologies are available to execute the idea [10]. Alias *et al.* reported that only less than 50.00 % of Malaysians know about the existence of green homes in Malaysia [11].

In a survey done in 2012, Umar & Khamidi discovered that most of people had heard about green building concepts which is about 83.30 % while only 16.70 % said they have never heard of green building [12]. The low level of awareness and knowledge among the industry practitioners themselves, especially the design teams, financial and contract advisors is an obstacle that must be surmounted in creating a capable and viable local construction sector. This situation could be partially reflected by findings reported by Tu *et al.* [13]. Even in Iskandar, Johor, the important southern economic corridor connecting Malaysia with Singapore, many industrial firms do not have a clear concept of what green technology is, what the criteria are for a green technology project to receive support from the government, or even what defines them as a “green concept”. The younger generation has been exposed to sustainable construction in their higher education studies to some extent, their lack of real-world experience means they have a problem putting their theoretical understanding of sustainability knowledge into practice. The low level of awareness of green issues creates another challenge, that of convincing older practitioners to change towards green construction. It is a challenging task to convince older practitioners to shift from the conventional approach towards the sustainable approach. Although some may be aware of sustainability, they still prefer traditional methods due to perceived constraints such as higher initial costs and lack of technical capability [14]. Nonetheless, a recent study conducted by Yassin *et al.* indicates an increasing level of awareness among the construction players toward the sustainable green building concept [15]. The study revealed that most respondents have moderate knowledge regarding green building (average mean=4.85), with the highest being on the statement of minimizing the use of materials that emit harmful pollutants (mean=5.09). This statement revealed that most respondents believe that green building is about reducing pollution.

Lack of knowledge and awareness of green buildings has become a barrier to its adoption, and this barrier could be overcome by providing related education to raise the knowledge and awareness levels of industry practitioners and the general public. As developers, contractors, and policymakers are major players in the adoption of green building technologies, it is considered that organizing educational programs to increase knowledge and awareness among them is essential to drive the adoption of green building practices. Education and awareness programs targeting the general public are highly valuable in facilitating the sustained growth of the green building market. The responsibility for executing such efforts may be effectively distributed among industry groups, governmental bodies, and non-governmental organizations. The growing recognition of the advantages associated with the adoption of environmentally friendly practices within society has led to a concomitant growth in the market value of green buildings.

## 2.3 Technological and Expertise Challenges

The rapid advancement of sustainable technologies and practices causes the previous skills to be no longer adequate to implement sustainable practices [9]. Lack of expertise, necessary troubleshooting equipment among building maintenance teams and difficulties in obtaining green technology from local industry are another major constraints in the implementation of sustainable building development. Technology poses a major challenge to the industry due to the high cost of application, the difficulty of obtaining local green products, and the lack of local technical skills to operate it. Furthermore, it is evident that a significant portion of the current maintenance personnel lacks proficiency in comprehending and maintaining the technological efficiency measures necessary to assure the building's compliance with the original design specifications since its commissioning [16]. These circumstances prompt developers to seek the advice of overseas environmental specialists. This scenario gives birth to an intractable quandary of increased reliance on foreign specialists, perhaps impeding the development of indigenous competence and incurring additional expenditures for overall progress.

Nonetheless, in recent years, there has been a rise in terms of green product choices in the country. Products such as solar power, water harvesting, used tires for cooling the house, reflective glasses to reduce heat emission, wall panels, eco-friendly paints, core ventilation system design, sustainable drainage systems and many more have already been introduced to the local industry [3]. However, production is still low and the industry suffers from a lack of competition. Moreover, imported products from advanced-economic countries require custom production to suit the local climate as many products manufactured in advanced-economic countries are based on their climate, which is unsuitable for Malaysia. This may incur extra costs on top of the delivery expenses.

The lack of sufficient expertise in utilising the necessary tools and technology to promote sustainable building poses a significant obstacle that must be resolved in order to improve the preparedness of project management teams in the home construction sector for sustainable building practices. The uncertainty among project stakeholders regarding the performance of green products and technologies creates another hindrance that delays the implementation of sustainable practices in housing development and improper documentation of specification and contract documents worsen the condition [9]. Hence, the government as the leading principal institution should encourage construction practitioners, educational institutions as well as, research and development bodies to enable more qualified local production of green building materials and technology at a lower cost. Sustainable technology training can also be provided to increase and deliver knowledge on sustainability through bodies like the Construction Industry Development Board (CIDB)

## 2.4 Lack of Enforcement and Incentives from the Government

The importance of the government’s role in assisting green building development is undeniable and greatly recognized. Mohd Nordin *et al.* suggested that the government should not only increase the green campaign but also improves stern enforcement on regulation, guidelines and legislation on green building development [5]. The effort to make green practice as a pre-requisite for the developers to secure their future projects can be a good start. With the right green incentive, a robust advocacy effort and strong support from the public, this day is soon approaching. Green incentives should be entailed with advocacy efforts to transform this conservation into actionable legislation and initiatives on the local and state levels [17].

According to the 12th Malaysia Plan, the government should be promoting green building in residential and non-residential sectors. Conversely, according to Samari *et al.*, professionals’ points of view regarding the level of developing green building in both sectors in Malaysia (Mean: 2.36) are not satisfactory [18]. It is clear that the current strategy for developing green buildings in Malaysia is not effective. The government has introduced several incentives, including tax exemption and stamp duty for green building development, as listed in Table 1. However, at this moment, many developers are not in a position to grab the ‘green’ opportunities due to internal organizational problems. According to Elias & Chong, the current incentives are not attractive enough to encourage construction firms to embrace green technology in their projects [19]. Nevertheless, Ayarkwa *et al.* reported a number of criticisms had been leveled on green tax incentives involving the qualifying expenditure, qualifying person, limited GBI income incentives, and stamp duty exemption where it is not extended to GBI-certified building attains higher category, such as from silver to platinum category and lack of clarity and details on qualifying expenditure as to what constitutes reference base cost for green asserts as some green asserts were given reference base cost while others were not [16]. Moreover, the growth of green building is the elevated initial expense associated with implementing new designs, technologies, and construction methods. Financial incentives are insufficient in offsetting the substantial initial expenses associated with green buildings, hence failing to render them more economically viable for construction firms [16]. Governmental assistance in promotions and financial incentives are needed intensely to provide low-risk and affordable financial resources for green developers in both commercial and residential sectors. Rewarding developers will be the driving force in adopting sustainable construction and spur innovation and demands for green building technologies.

**Table 1 - Current green incentives implemented in Malaysia**

Name	Purpose of incentive	Type of benefits	Beneficiary sectors	Types of incentives
Promotion of Investment Act 1986	Promote energy conservation	Pioneer status and tax allowance for 100% of statutory income for 10 years	Energy service companies implementing energy conservation projects	Financial
2020 Budget	Promote green technology	Green Investment Tax Allowance (GITA): ITA of 100% on QCE which can be set-off against up to 70% of the statutory income be extended to 2023	Companies that acquire qualifying green technology assets and there are listed under MyHIJAU Directory	Financial

Promote green technology	Green Income Tax Exemption (GITE): Income tax exemption of 70% of statutory income be extended to 2023	Companies that undertake a qualifying green technology	Fiscal
Promote renewable energy	Income tax exemption of 70% of statutory income for a period of up to 10 years of assessment for solar leasing companies certified by Sustainable Energy Development Authority (SEDA).	Companies that provide green technology services which have been verified by GreenTech Malaysia, and listed under the MyHIJAU Directory.	Fiscal

### 3. Conclusion

The current review indicates the major constraint of implementing green buildings in Malaysia is a higher capital upfront that includes professional fees, green assessment fees, design, and material costs. Awareness and knowledge should be enhanced and delivered to project stakeholders concerning the long-term benefits of integrating affordable and sustainable buildings. Moreover, public awareness about green building has been an important component that led to high demand. Improving public awareness about green building leads to better-informed consumers who demand better products from companies and encourage more green building development. The findings from various literature also suggest that government interventions, especially economic and advocacy incentives, are the significant drives for the stakeholders to take interest in the green building investment. It requires the commitment from all relevant parties to pursue development more sustainably, apart from the economic aspect, to ultimately create better well-being and quality of life among the citizens.

### Acknowledgement

The authors would like to thank Mr. Azman Ali, the Director of KKTM Sri Gading and the academic staffs of Department of Highway and Transportation, KKTM Sri Gading for their continuous guidance and support on the writing of this review.

### References

- [1] N. B. L. Suzila *et al.*, "The Implementation Of Green Building In Malaysian Construction Industry: Determination Of Key Success Factors," *Malaysian J. Sustain. Environ.*, vol. 1, no. 2, pp. 64–79, 2016.
- [2] M. R. bin Esa *et al.*, "Obstacles in Implementing Green Building Projects in Malaysia," *Aust. J. Basic Appl. Sci.*, vol. 5, no. 12, pp. 1806–1812, 2011.
- [3] N. Z. Abidin *et al.*, "A Foresight into Green Housing Industry in Malaysia," *Int. J. Environ. Chem. Ecol. Geological Geophys.*, vol. 6, no. 7, pp. 55–63, 2012.
- [4] T. K. Yen *et al.*, "Human factors issues in Malaysian green building development: A review," *Hum. Factors Ergon. J.*, vol. 1, no. 1, pp. 27–32, 2016.
- [5] R. Mohd Nordin *et al.*, "Challenges in the Implementation of Green Home Development in Malaysia: Perspective of Developers," in *International Conference on Architecture and Civil Engineering (ICACE 2017)*, 2017, vol. 291, p. 012020.
- [6] Q. K. Qian *et al.*, "Challenges in delivering green building projects: Unearthing the transaction costs (TCs)," *Sustainability*, vol. 7, no. 4, pp. 3615–3636, 2015.
- [7] L. B. Robichaud and V. S. Anantamula, "Greening Project Management Practices for Sustainable Construction," *J. Manag. Eng.*, vol. 27, no. 1, pp. 48–57, 2011.
- [8] A. Nalewaik and V. Venters, "Cost benefits of building green," *IEEE Eng. Manag. Rev.*, vol. 38, no. 2, pp. 77–87, 2010.
- [9] S. Y. Wong *et al.*, "Barriers for green building implementation in Malaysian construction industry," in *The 13th International UNIMAS Engineering Conference 2020 (ENCON 2020)*, 2021, vol. 1101, p. 012029.
- [10] Y. Zhang *et al.*, "A survey of the status and challenges of green building development in various countries," *Sustain.*, vol. 11, no. 19, pp. 1–29, 2019.
- [11] A. Alias *et al.*, "The green home concept-acceptability and development problems," *J. Build. Perform.*, vol. 1, no. 1, pp. 130–139, 2010.
- [12] U. A. Umar and M. F. Khamidi, "Determined the Level of Green Building Public Awareness: Application and Strategies," *Int. Conf. Civil, Offshore Environ. Eng.*, 2012.
- [13] T. Fan *et al.*, "Promoting Urban Sustainability through Green Technology in Malaysia," 2016.
- [14] A. A. Mohamad Bohari *et al.*, "Insights into the adoption of green construction in Malaysia: The drivers and challenges," in *7th Asia-Pasific International Conference on Environment-Behaviour Studies*, 2016, vol. 1, no. 4, pp. 37–46.

- [15] A. M. Yassin *et al.*, "To study an awareness on sustainable green building practices amongst construction industry players," *J. Soc. Sci. Res.*, vol. 6, pp. 1033–1040, 2018.
- [16] J. Ayarkwa *et al.*, "Sustainable building processes' challenges and strategies: The relative important index approach," *Clean. Eng. Technol.*, vol. 7, p. 100455, 2022.
- [17] S. Z. Hashim *et al.*, "Implementation of green building incentives for construction key players in Malaysia," *Int. J. Eng. Technol.*, vol. 8, no. 2, pp. 1039–1044, 2016.
- [18] M. Samari *et al.*, "The investigation of the barriers in developing green building in Malaysia," *Mod. Appl. Sci.*, vol. 7, no. 2, pp. 1–10, 2013.
- [19] E. M. Elias and C. K. Lin, "The Empirical Study of Green Buildings (Residential) Implementation: Perspective of House Developers," *Procedia Environ. Sci.*, vol. 28, pp. 708–716, 2015.