

Benefits of Green Building from Client's Perspective

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Abstract

Sustainable development has been highlighted in the 11th Malaysia Plan, 2016-2020 to make sure all development meets the needs of the present without compromising the ability of future generations to meet their own needs. An example is the development of green building refers to both a structure and the use of processes that are environmentally responsible and resource-efficient throughout a building's life-cycle: from siting to design, construction, operation, maintenance, renovation, and demolition. Therefore, this paper presents the benefits of green building from the client's perspective. All variables have been identified from available literature and from that a set of questionnaire was built and sent to 32 clients around Selangor. The data was analyzed using the Statistical Package for Social Sciences (SPSS) and Mean. The research shows that limiting the building impact on the environment during the building's lifecycle and protecting occupants' health are the first and second ranking. This paper will be useful and inspirational to other clients to develop more green buildings due to their many benefits.

Keywords: Benefits, green building, building

1.0 Introduction

Green building is fundamentally about limiting environmental destruction, it's about making a healthy, comfortable environment inside the home. The materials used in the Green building normally look very conventional, or use very uncommon materials and look truly unusual and anything in the middle (Norm Miller et al., 2008). Green buildings are huge issues in the construction industry all over the world including in Malaysia. There are many reports/policies/rules and regulations highlighting the matter to make all the stakeholders responsive but the acceptance in Malaysia are still low.

Among the vital obstacles to green building construction are insufficient responsibility from the clients and behavioral elements which head to change opposition. Although Green Homes have existed for quite some time yet there is no substantial expertise and experienced green building developers accessible in Malaysia. The implementation of sustainable green construction in Malaysia has been slowed by the lack of research and innovation (Alias et al., 2010). As such, demand for green building is automatically low. According to Abd Hamid (2012), lack of skill and capacity, overlapping roles among government agencies and slow industry follow-through on government programs have also confined access to the implementation.

In addition, the reason why the development of Green Building in Malaysia is slow because the developers confronted a lot of problems when creating green homes in Malaysia. One of the problems is the lack of green technology available in Malaysia. Despite the government's effort to promote sustainable development and green technology in Malaysia, the greatest issue is that most of the green materials and green technology used to develop green homes are not available in Malaysia (Alias et al., 2010).

A large number of developers stated that the greatest obstacle to green development is the higher financing expenses that might be incurred and the danger from claiming unforeseen costs. Green construction will be not implied for large budget only. The cost of constructing green buildings differ in the same path as they do for conventional ones, that is, green buildings may be achieved on both small and large budgets. Moreover, dread of the unknown, lack of understanding and lack of interest to green structures are among the identified culprits of wider application of green development (Nurul Diyana, 2013). A lot of research is needed to present the benefits and advantages gained by clients in order to encourage and motivate all construction stakeholders to develop green buildings.

2.0 Green Building in Malaysia

Malaysia has been moving towards greener mindset. There is more sense of environmental awareness than before in this country though it is still at a low level compared to countries like Denmark, Germany, or Japan. According to the Green Building Index, there are now more than 300 (Table 1) development projects certified by GBI as officially green buildings in Malaysia. Based on the data, the development of green buildings should be rising. The number of projects is still in the lower stage compared to other countries.

Table 1.0: GBI projects by State/ Territory

State/ Territory	Registered Projects	Certified Projects
Kuala Lumpur	191	108
Selangor	230	110
Penang	60	29
Putrajaya	35	23
Johor	55	17
Melaka	17	8
Sarawak	11	4
Sabah	10	1
Perak	6	2
Pahang	10	1
Negeri Sembilan	7	4
Kelantan	1	-
Kedah	3	1
Perlis	-	-
Terengganu	-	-
Labuan	-	-

Sources: Green Building Index (2015)

With global concern on the environment and sustaining the world resources for the future generations, Malaysia has also embarked on initiatives for sustainable development. The Construction Industry Development Board Malaysia (CIDB) is a body to develop and modernize Malaysia. The Malaysian Construction industry has always taken a proactive action to address the issues and assist the stakeholders in its adoption (Raheleh Rostami et al., 2012). Moreover, The Ministry of Energy, The Energy Commission, MIDA (The Malaysian Industry Development Authority) promote renewable energy resources, Ministry of Housing and Local Government (MHLG) and National Hydraulic Research Institute of Malaysia (NAHRIM) promote rainwater harvesting for residential and industrial buildings while the Malaysian Institute of Architects (MIA) until now is trying to incorporate design guidelines for Energy Efficiency (Zuhairuse, 2012).

New commercial and mixed commercial developments must accomplish five things: rainwater harvesting system, green building index (GBI) compliance, used of light emitting diode (LED) lamps, eco-friendly development manual (Masma) specifications and a landscaped area of about 10% to 15% out of their total development area. These prerequisites must be satisfied initially when applying for development approvals. In Selangor between 2010 and 2011, Petaling Jaya City Council (MBPJ) reportedly gained 418 applicants, and at the same time there were 117 requisitions to 2012 and 93 as of September 2013 (The Star Online, 2014).

New developments will have to comply or meet the requirements of the green building standards. So, buildings have to meet the criteria on energy and water efficiency. The developer must fulfill all the requirements imposed by the GBI for example using materials such as LED lights, efficient energy usage through solar panelling or even sufficient windows where sunlight can come through. MBPJ recently did for their project in Petaling Jaya where they are using low carbon city project such as LED lights for all new developments (The Star Online, 2014). Not only that, developers are also required to include a landscaped area of about 10% to 15% in their projects. This space will have to be free from utilities and other structures and set aside for landscaping. This GBI requirement, however, is only required for bigger-scale developments like commercial units or mixed developments.

Clients are urged to go green and stand a chance to get an assessment rebate of up to 100%. The quality of the rebate will be determined against six criteria such as energy, water, transport, compost, biodiversity and other green initiatives they may have. For example, cultivate a garden in the house or participate in recycling activities. So, the owners of semi-detached houses, terrace houses, bungalows, apartments, condominiums and flats are eligible to get such rebate. The procedure is, the applicants will need to present their application forms along with a copy of their latest assessment bill, electricity bill, water bill and myKad. Homeowners who have received the rebate will be required to reapply for the following year. They will also be required to take on more green

initiatives. It's quite special because not all countries implement this kind of scheme (The Star Online, 2014).

3.0 Benefits Of Green Building

According to Ir Chen Thiam Leong (2009) green building have many benefits such as better use of building resources, significant operational savings and increased workplace productivity. Building green sends the right message about a company or organization; that it's well run, responsible, and committed to the future. The following are the benefits reviewed from past research:-

a) The Environment

Good sustainable design offers economics, environmental and societal benefits. A planted roof can reduce the environmental impact of a building by reducing pollution from the building's power usage, as well as reducing the city's heat island effect. Another environmental benefit of planted roofs is reduced storm water runoff. Careful construction techniques can reduce the amount of construction waste that reaches landfills by 95% or more. Re-use of existing structures can reduce resource consumption while preserving our country's heritage. Careful siting can make buildings perform better from both environmental and human perspectives: proximity to transportation reduces pollution and improves occupants' quality of life (Kevin K., 2009).

b) Energy Efficiency

Energy is a substantial and widely recognized cost of building operations that can be reduced through energy efficiency and related measures that are part of green building design (Gregory, 2013). Energy efficiency is one of the best advantages of Green buildings such as using solar energy as its energy source. Indeed, it is one of the biggest hopes to make Malaysia a regional hub for green technology particularly for renewable energy such as solar photovoltaic for example, the use of solar cells for energy by converting solar power directly to electricity (Occupational Structure the Green Technology Industry, 2011).

According to Gregory (2013), a detailed review of 60 LEED-rated buildings demonstrates that green buildings when compared to conventional buildings are on average 25%-30% more energy efficient. This is characterized by even lower electricity peak consumption, more likely to generate renewable energy on-site and more likely to purchase grid power generated from renewable energy sources (green power and/or tradable renewable certificates).

Studies proved that those buildings which are built with wood will have a lower embodied energy than buildings made of brick, steel or other materials. What about operating energy? Designers try to find solutions to reduce it too. They use extra-insulation, high-performance windows, and passive solar design. The latter is very efficient especially if the windows are effectively placed (Frank Redavide, 2013).

c) Productivity

The relationship between worker comfort/productivity and building design/operation is complicated. It was shown that there are thousands of studies, reports and articles on the subject that find significantly reduced illness symptoms, reduced absenteeism and increases in perceived productivity over workers in a group that lacked these features. Listed below are some relevant attributes common in green buildings that promote healthier work environments based on the Occupational Structure the Green Technology Industry Report:-

- On average 25%-30% more energy efficient.
- Much lower source emissions from measures such as better siting.
- Locating air intakes next to outlets, such as parking garages, and avoiding recirculation, and better building material source controls.
- Essentially better lighting quality including: more day lighting in any event 75% of building space, greater occupancy control over light levels and less glare.
- Generally improved thermal comfort and better ventilation especially in buildings that use under floor air for space conditioning.

Commissioning, use of estimation and verification, and CO₂ monitoring to guarantee better performance of systems such as ventilation, heating and air conditioning.

d) Financial

Nevertheless, green construction will face higher initial cost than conventional construction due to the increasing consultant's fees, the newness of the design team, and the cost of building appraisal tools documentation. Kibert

(2012) explained that costs of green building materials are often more than materials they replace. For example, a compressed wheatboard, a green substitute for plywood, currently costs as much as 10 times more than the plywood replaced. However, the cost is recoverable over the life cycle of operations and maintenance of the buildings (Nurul Diyana et al., 2013). Furthermore, 50% less amount of water can cut down waste for green home compared to conventional home. YTL green home project uses low-flow water fixtures and grey water recycling system to decrease the water usage of the house. As a result, it provided water effectiveness while cutting down the expenses of the homeowners in the long run (Alias et al., 2010).

Indeed, clients are realizing that despite the marginal rise in building costs when they decide to make their projects “green”, their properties fetch higher value when they resell them. In fact, developers have noticed that “green” for their building is a quick ticket to bigger profit and a means to raise the gross development value of their projects. The increasing income due to funds in capital and operational costs, improved marketability and public profile for developers help the investment.

4.0 Methodology

The research adopted two principal methods namely literature review and questionnaire survey. A thorough literature search on either primary sources or secondary sources was conducted through academic research journals, proceedings, dissertations, occasional papers, publications, textbooks, newspaper and online databases. Referring to previous research design also enables the author to grasp the problems and issues related to the topic of study and provide important insight to the author on how to design an efficient research study. Questionnaire survey is the main research methodology used to achieve the research objectives. Thirty two (32) sets of questionnaires were distributed by post and via the internet to targeted respondents in Selangor. . The questionnaire contains a list of the benefits of Green Building and likert scale question. Data obtained from the returned questionnaire was sorted out and analyzed using SPSS Version 11.5. Ultimately, conclusions were drawn up to summarize the data gained from questionnaire survey and literature review.

5.0 Findings

All respondents are required to assess the benefits of Green Building. The respondents have to evaluate by giving answers in the form of scale from 1 to 5. 1 refers to Strongly Disagree, 2 refers to Disagree, 3 refers to Moderate, 4 refers to agree and 5 refers to Strongly Agree. The results are as per Table 2.

Table 2: The result on the benefits of Green Building

Benefits	MEAN
The Environment	
Limiting the building impact on the environment during the building’s lifecycle	4.59
Reduce the environmental destruction.	4.16
Protecting occupant health.	4.22
Financial	
Cost-effective where its offer lowers operations and maintenance costs.	4.03
Cut operating costs from reduced energy and water consumption.	4.34
The income increase due to savings in capital and operational costs.	4.09
Energy Efficiency	
Generate renewable energy.	3.91
Purchase grid power generated from renewable energy sources.	3.97
Lower electricity peak consumption.	4.00
Productivity	
Increase the level of occupant productivity.	4.00
Promote healthier work environments.	4.22
Reduce or slow rise in electricity and gas prices through expanded green construction.	4.06

Table 2 shows that the respondents agreed that Green Building can limit the building impact on the environment during the building’s lifecycle as the highest score mean with 4.59 because the main objective of the Green Building is to avoid such impact so, everybody is focusing on it. Mean score 4.22 of the respondent respond that the Green Building also protects occupants’ health. Protecting occupants’ health for environmental factor is one of the benefits those respondents obtained when the Green Building was been implement. The mean score for this statement is 4.16.

The analysis found that the highest benefit in executing the Green Building in Malaysia is that users can cut operating costs from reduced energy and water consumption because the building uses natural sources where it is agreed by 4.34 of total respondents. It is then followed by the the income increase due to savings in capital and operational costs where 4.09 agreed with the statement. The third highest benefit is due to the cost-effective where it offers lowers operational and maintenance costs that carry the mean score of 4.03.

Table 2 shows the result of the benefits of the Green Building for energy efficiency factor, most of the respondents agreed that characterized by even lower electricity peak consumption with 4.00 mean score. It is followed by more likely to purchase grid power generated from renewable energy sources which is 3.97. The other factors contributing to the benefit by the client is more likely to generate renewable energy (3.91) that is agreed by most of the respondents.

From the analysis, the result found the highest score is 4.22 that is can promote healthier work environments. Most of the respondents have agreed with the statement where average 25-30% more energy efficient (Occupational Structure the Green Technology Industry, 2011). Additionally, reduced or slow rise in electricity and gas prices through expanded green construction became a benefit during carrying out Green Building projects. It is supported by a mean score of 4.06 which is among the highest value. Increased level of occupant productivity is also one of the benefits gained by the clients to consider Green Building projects. The mean score for this statement is 4.00.

6.0 Conclusion

Clients granted green building index offers numerous benefits such as improved indoor environment quality, increased health and occupant productivity and minimization of resource usage during the construction and operation of the building. Conversely these buildings achieve superior long term performance making them attractive investments for facility owners and clients in both public and commercial sectors. As a result the cost of green building is cost-prohibitive. Client need to invest a lot of money but later with energy saving possibilities the invested money may be recouped.

There are many action needs to be taken in order to encourage all Malaysian (kids and adults) live in sustainable development. It is must be start with our daily routine activities at the end, it is will be a habits for example 3R (reduce, reuse and recycle). Therefore, there are many research need to execute in order to increase the awareness of Malaysia with the Green Environment especially to the construction stakeholders because some of them are reluctant to comply with requirements stipulated by the government.

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