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Green Building: Strategic Approach to Sustainable Economy

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Abstract:

Green buildings generally known because of the economic benefit of saving utility bills, return higher rent, offer faster letting, greater occupants' health and higher resale value compared non-green buildings. In an economic environment where the quality is the main objective, green buildings provide higher quality with reasonable additional cost. As an economic point of view green buildings also decrease a variety of risk factors such as, marketing, financial and political. This study attempts to investigate the role of green buildings to promote a sustainable economy. The data has been collected through literature review. Results reveal that green construction will lead to sustainable economy in national level according to high contribution with Gross Domestic Product.

Keywords: Green building, Benefit, Sustainable development, Economic Growth, Malaysia

1. Introduction

Construction industry is considered as one of the main industries in the world with direct effect on the global finance. Construction yields an annual output of US \$4.6 trillion, contributing to 8–10% of the global GDP encompassing a workforce of 120 million people and billions of transactions each day. In the US, construction comprises 13.4% of the \$13.2 trillion US GDP, in which commercial and residential building construction constitutes 6.1% of the GDP (Department of Commerce, 2011). There is a gap between amounts of construction industry contribution to GDP in developed countries comparable developing countries. According Lowe (2003) the relationship between the construction industry and gross domestic product in developed countries is in the range of 7% to 10% and for developing countries around 3% to 6%.

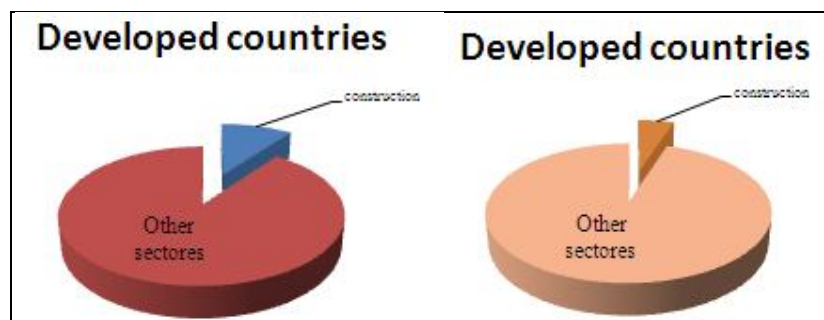


Figure 1: The construction of the construction industry into GDP (Lowe, 2003)

2. The Construction Industry of Malaysia

The construction industry of Malaysia is separated into two areas. The first area is general building, which include residential building, non-residential building and civil engineering building. The second area is special trade works related to the construction includes the activities of metal works, electrical works, etc. (Malaysian and German Chamber of Commerce, 2011).

The estimate portion of construction industry in Malaysia is 5% to 6% of the GDP at the end of 2012, there is provided job opportunities for almost 1.03 million people which represented 8% of total workforce (CIDB, 2006). Estimation demand for construction under 9th Malaysia Plan is projected at RM 280 billion in the average of RM 56 billion per year. The projection

based on estimation of RM 180 billion of government funded projects, RM 140 billion of private funded and RM 20 billion Public Finance Initiatives (PFI) in this stipulated time frame (CIDB, 2008).

The construction industry makes up an important part of the Malaysian economy due to the interaction with other industry branches. Hence, the construction industry could be described as a substantial economic driver for Malaysia to achieve sustainable economy (Abdulllah et al, 2004).

3. Green Building

Green building is an important area where cities can implement sustainability objectives. Green buildings are designed to reduce negative impacts on the environment while increasing the occupant health, by addressing these five categories:

- Sustainable site planning
- Safeguarding water and water efficiency
- Energy efficiency, renewable energy and lower greenhouse gas emissions
- Conservation and reuse of materials and resources, and
- Improved health and indoor environmental quality

In the recent decade, green building becomes more popular because the financial benefits of green building are becoming clearer for government, developers and homeowners. The comprehensive reports to examine the costs and benefits of green buildings conducted by Kats for the state of California in the United State. According to Kats, the average cost premium over just building to code is less than 2%. The Kats report finds “that minimal increases in upfront costs of about 2% to support green design would, on average, result in life cycle savings of 20% of total construction costs – more than ten times the initial investment”. The majority of savings from green building are in maintenance and utility costs.

Category	20-year Net Present Value
Energy savings	\$5.80
Emissions savings	\$1.20
Water savings	\$0.50
Operations and maintenance savings	\$8.50
Productivity and health value	\$36.90 to \$55.30
subtotal	\$52.90 to %71.30
Average extra cost of building green	(-\$3.00 to \$5.00)
Total 20-year net benefit	\$49.90 to \$66.30

Table 1: Financial benefits of green buildings (per ft.²)
Source: Capital E analysis, www.cap-e.com

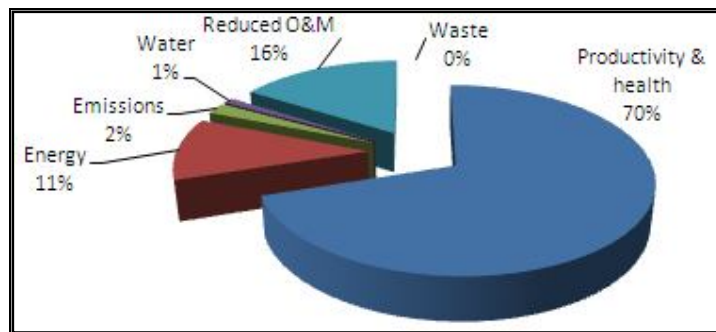


Figure 2: Breakdown of green building financial benefit (LEED certified & silver levels)
Source: Capital E analysis, www.cap-e.com

Construction industries have indirect and direct emissions in a high amount. Therefore an environmentally sustainable building is tremendously important. Furthermore, living in environmentally sustainable houses have many advantages such as increased health of occupants; improve worker performance (Samari, 2012).

3.1. Water and Energy Savings

Urbanization means increasing number of buildings and developing the construction industry and increasing consuming energy in the buildings. This fast developing makes Malaysia as one of the main producer CO₂ in region (International Energy Agency, 2009). As buildings are one of the main emitters of CO₂ globally (Civil Exchange, 2008), therefore energy efficient building concept is critical for current situation in Malaysia as a way to control CO₂ emission at national level. Energy consumption is one of the criteria that must be under consideration in construction industry. Both residential and commercial buildings are response for 40% of electricity consumption. Commercial office buildings use 20% more energy on average than necessary. Current Malaysian office buildings used high electricity consumption at 250 KWhr/m² per year according to GBI BEI (Building Energy Index). However the benchmark of BEI for energy efficient building would be less than 150 KWhr/m² per year (Leong, 2010).

Green building by using 26% lower energy consumption compared non-green traditional buildings is a sustainable concept for construction development. Energy efficiency in building not only decrease owner expenses but also contributes with economy growth as well. It is more tangible at current condition with high global oil price. In terms of CO₂ emission, green building produces 33% greenhouse gases less than normal buildings. It is related with quality of air and lower impacts on the environment.

3.2. Increased Property Values and Sales Improvements

Generally the cost of energy consumed in non-green building is high; therefore the low cost of operating and simple maintenance of the green building will make for lower vacancy rates along with much higher property values. Base on, Investment in energy efficiency and lower utility bills. For instant at the Orange County in the United States of America, it is led to a \$0.80-per-square-foot-market value improvement, or a \$1.5 million increase in value.

In addition market value of buildings which adopted with green standards is 7.5% higher than normal buildings. This market value influences developers as well as owners. Although upfront costs of green buildings are slightly higher for developers, they will be recouped by higher market value at the end of the projects. Other financial benefits that might be achieved by applying green concept are higher occupancy ratio and rent ratio respectively 3.5% and 3% higher than normal buildings. In terms of sales improvement, green building because of lower energy and water consumption, higher indoor environment quality and lower operation costs are more attractive for clients therefore green building have higher demand from the society and property buyers and higher sales ratio compared with normal buildings.

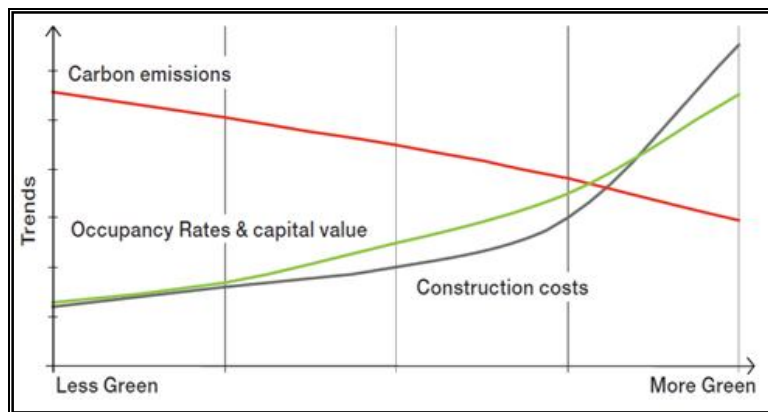


Figure 3: Green building benefits

3.3. Improved Employee Attendance and Productivity

Control of temperature and ventilation with increased natural lighting are one of the most important benefits of the green buildings which led to improved employee attendance and health in the building. These benefits improve the quality of indoor environment. According to the U.S Green Building Council report, employees who work in green offices had a 15% drop in employee absenteeism.

Enormous of studies identified an association between indoor environment quality (IEQ) and asthma and allergies (Goe, 2004; Fletcher *et al.*, 2006; Henneberger, 2007; Moorman, 2007). Main cause of illness and disorder in the United States is allergies. In 2005, 22.2 million people in U.S infected by asthma. Indoor environment design can increase or decrease allergens factors in buildings. Humid rooms, visible mold and mold odor, high temperature and indoor pollutants can promote environment for thriving allergens and irritants (Fletcher *et al.*, 2006).

Indoor environment quality (IEQ) influences occupants' psychological health (Spector, 2006). Psychological health includes such issues as anxiety, depression, stress as well as feelings of confidence, energy, and generally being in good spirits. Studies stated that access to natural view; improved ventilation and temperature condition in working environment positively influence employee's performance and productivity (HMG, 2003). In addition students' learning ability improved up to 21% in classes with the most daylight compared students who study in classrooms with the least daylight (HMG, 1999). Accordingly people who living in a good indoor environment quality not only enjoy better physical condition but also they have better psychological condition compared those living in poor indoor environment condition (Ghodrati, 2012).

According to Fisk (2002) higher IEQ in U.S buildings resulted in 6-14 b\$ annually. In addition 1-4 b\$ gained from reduced allergies and asthma cases among the workforces. These figures represent enhanced indoor environment quality through controlled ventilation, and avoidance of moisture problems. Lower death ratio from CO poisoning and lung cancer caused by radon can be add to these economic benefits.

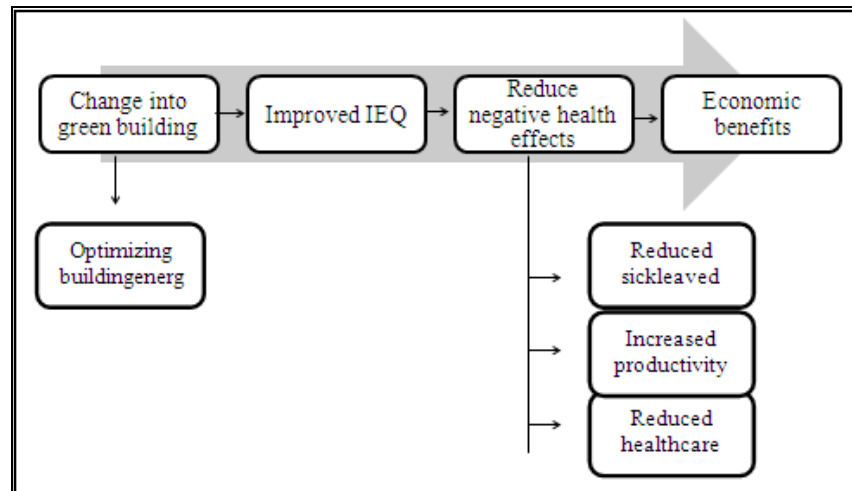


Figure 4: Process to health and economic gains

4. Conclusion

Malaysia is moving toward developed country by 2020. High level of urbanization is resulted from the fast economic growth. There is no doubt that construction industry has strong contribution with the country development and GDP. As both residential and commercial building are considered as main energy consumption in Malaysia, therefore there is an urgent need to achieve more energy efficiency buildings concept in order to reach the sustainable economy development as well. Green building concept brought variation of benefits that directly influence national economy. These buildings by using lower energy, water and natural resources can enhance the economy by provide high amount of saving on energy and natural resources and return them to economy to be invested in other parts which are suffered from lack of financial resources. Increasing the market value and higher sales ratio not only influence property owners and developers companies directly, but also promote real estate market which lead to billions Ringgit transactions annually. As construction industry encompasses for large amount of workforce, therefore developing green concept of construction can create new job opportunities. Green buildings by providing better indoor environment quality can decrease health care costs and sickness, improve productivity as well as occupant satisfaction. These factors will bring high profit for companies which are located at offices with green standards. All above mentioned benefits can be achieved by promoting green construction development as a strategic approach. In addition all these benefits influence whole industry as well. As construction industry and national economy are closely interrelated together, therefore green building concept by promoting construction industry indirectly contribute to sustainable economy development in country.

5. References

1. Abdullah, F.M, Chiet, V.C, Anuar, K and Shen, T.T. (2004), An Overview On The Growth and Development Of The Malaysian Construction Industry. Workshop on Construction Contract Management, Universiti Teknologi Malaysia.
2. Civil Exchange, 2008. Submission on A Proposal on The Mandatory Implementation of The Building Energy Codes, Access via <http://www.civic-exchange.org/eng/publication.aspx>. (Sep, 2011).
3. Construction Industry Master Plan 2006-2015, (CIMP 2006-2015) 2006, Construction Industry Development Board (CIDB) Malaysia, December 2006, Kuala Lumpur.
4. Fisk, W. J. (2002). How IEQ affects health, productivity." ASHRAE J (25): 56–58.
5. Fletcher, A. M. and London, M. A. and Gelberg, K. H. and Grey, A. J. (2006). Characteristics of patients with work-related asthma seen in the New York State occupational health clinics. J. Occup. Environ. Med. 48(11): 1203–1211.
6. Ghodrati, N. (2012), Study on Green Buildings Impacts on Occupants' Health and Productivity, IEHSC, Malaysia.
7. Goe, S. K. (2004). A descriptive study of work aggravated asthma. J. Occup. Environ. Med (61): 512–517.
8. Hescong Mahone Group, (1999). Daylighting in schools: An investigation into the relationship between daylighting and human performance. Fair Oaks, Calif.
9. Hescong Mahone Group, (2003). Windows and offices: A study of office worker performance and the indoor environment, Fair Oaks, Calif.
10. Henneberger, P. K. and Derk, S.J. and Sama, S.R. (2005). The frequency of workplace exacerbation of asthma. Eur Respir J. 26(Suppl 49):34S.
11. International Energy Agency, Key World Energy Statistics, 2009, Access via http://www.iea.org/textbase/nppdf/free/2009/key_stats_2009.pdf, (Sep, 2011).
12. Leong, Y. L. (2010), Integrating Green Initiatives Into Existing Commercial Buildings, Master Thesis, Construction Management, University Teknologi Malaysia.
13. Lowe, J.L. (2003). Construction Economics, www.callnetuk.com/home/johnlowe/70/
14. Malaysian Construction Outlook (2008), Presentation by Business Development Division, Construction Industry Development Board (CIDB), August 2008.

15. Malaysian-German Chamber of Commerce, Market Watch 2011 – The Construction Sector
16. Moorman, J. E. (2007). National surveillance for asthma—United States, 1980–2004. Morbidity and Mortality Weekly Rep., Center for Disease Control and Prevention.
17. Samari, M.(2012).Sustainable Development in Iran: a Case Study of Implementation of Sustainable Factors in Housing Development in Iran. IPEDR vol.37, ACSIT Press, Singapore
18. Spector, P. E. (2006). Individual differences in health and well-being in organizations. Health and safety in organizations: A multilevel perspective, John Wiley, San Francisco