Identifying the house buyer needs and product concepts for the mass development of green home in Malaysia.

Radzi Ismail[1], **Mohd Wira Mohd Shafiei**[2] and **Ilias Said**[3]
[1, 2, 3]Universiti Sains Malaysia, Pulau Pinang, Malaysia
[1]radhi_ismail@yahoo.com, [2]wira@usm.my, [3]ilias@usm.my

ABSTRACT: Green building is defined as a whole systems approach to the design, construction and operation of buildings – from the early stages of development through the final finishes in the home. The concept of green home is the convergence of three fundamental objectives, namely, the conservation of natural resources, the improvement in energy efficiency, and better indoor air quality. For green buildings to be more comfortable and satisfying than conventional buildings there must be some features that are unique, or at least more common, to their design that could contribute to a better indoor environmental quality. In Malaysia, there had been little effort to mass-develop green homes so that these houses can be bought easily by the house buyers. Because of this scenario, a marketing research focusing on reducing the uncertainty associated with any new product such as these green homes, need to be carried out before any property developer will want to build these houses, and consequently, for these houses to be accepted by the house buyers. To ensure continued growth in the adoption of green building technologies, it is important to ensure that customer needs are being addressed. Despite the good examples shown by the other developed countries on how to build houses sustainably, Malaysia are relatively behind so far in this aspect. This, despite the fact that, the technology to build sustainable house are there for the Malaysian developers and construction professionals to harness. This paper attempts to put into effect a marketing research that looks into the possibility of mass-developing green homes in Malaysia. We will only look into the house buyers' green homes needs, and then, the right concepts for the homes. Hence, both sides in the market will be studied: the providers (consist of property developers, contractors, and construction consultants) and the house buyers.

Keywords: Green building, marketing, house buyers.

INTRODUCTION

Green Building or Green Homes is one concept of sustainable development. According to Brundtland Report defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Vouvaki, D. and A. Xepapadeas 2007, Wedding, G. C. and D. Crawford-Brown 2007). Sustainable development is a concern of attitudes and judgement to help insure long-term ecological, social and economic growth in society (Ding, G. K. C. 2008). Alamenda County (2002) defines Green Building as a whole system approach to the design, construction and operation of building from the early stages of development through the final finishes in the home. The positive impact from green building is including lowered operating

cost, reduced resource consumption, healthier working and living environments, and reduced waste this fact of causing growing interest (Wedding, G. C. and D. Crawford-Brown 2007).

According to Xia, C., Y. Zhu, et al. 2008 mention the theory of green buildings is a lower environment load, higher energy efficiency and resource saving throughout a building's whole life cycle. Heerwagen J. (2005) believed that green buildings are more comfortable than conventional buildings which provide more satisfying and productive workplaces. To influence satisfaction and performance via psychosocial arousal that suggestion must consider the temperature, sound and lighting of building (Paul and Taylor 2007). Green building also enhances the environmental awareness of building practices and lays down the fundamental direction for the building industry to move towards environmental protection and achieving the goal of sustainability (Ding, G. K. C. 2008).

Green building have been produced because awareness of environmental issues. According to Ding G. K. C. 2008, environmental issues become more urgent, more comprehensive building assessment methods are required to assess building performance across a broader range of environmental considerations. Affect from the urbanization process which its fast population increase and creates changes in the urban atmosphere. These changes happen as a function of anthropogenic activities, such as air pollution, industrial activities, vegetation suppression, population increase, etc. These effects lead to the formation of heat islands in the cities and create what is called ‘‘urban climate’’ (Kruger, E. and B. Givoni 2007).

The most attribute for pollution is construction. Ding G.K.C (2008), mentions about construction is one of the largest end users of environmental resources and one of the largest polluters of manmade and natural environments. During the process of manufacturing various building materials, especially decomposition of calcium carbonate, lime and cement manufacturing, high concentration of carbon monoxide, oxides of sulphur, oxides of nitrogen and suspended particulate matter are invariably emitted to the atmosphere. This factor will influences human health and their living condition (Pappu, A., M. Saxena, et al. 2007).

According to Pappu, A., M. Saxena, et al. (2007), traditionally materials like clay, sand, stone, gravels, cement, brick, block, tiles, distemper, paint, timber and steel are being used as major building components in construction sector. All these

materials have been produced from the existing natural resources and will have intrinsic distinctiveness for damaging the environment due to their continuous exploitation.

The most important thing in the marketing we must know the customers needs. Paul and Taylor (2007), to ensure continued growth in the adoption of green building technologies it is important to ensure that customer needs are being addressed and that claims of performance are warranted; this means evaluating the performance and life-cycle costs of new green buildings as they come on line.

Industrial sectors, including the building sector, started to recognize the impact of their activities on the environment in the 1990s. Significant changes were needed to mitigate the environmental impact of building sector. The building sector had to focus on how buildings were designed, built and operated. (Appu Haapio, Pertti Viitaniemi 2008)

According to Ding G. K. C. (2008), the more effective way of achieving sustainability in a project is to consider and to incorporate environmental issues at a stage even before a design is conceptualised. It is important to separate project design and project assessment as building design takes place at an early stage and most of the outcomes of the design have already been established and incorporated into the final design. Still today the connotations of sustainability are many, from progressive environmental design or the long-term success of a business enterprise to healthy, vibrant communities with a high quality of life (Wedding, G. C. and D. Crawford-Brown 2007).

Designing low-energy buildings in high density areas requires special treatment of the planning of urban structure, co-ordination of energy systems, integration of architectural elements and utilisation of space. As building design needs to consider requirements and constraints, such as architectural functions, indoor environmental conditions, and economic effectiveness, a pragmatic goal of low-energy building is also to achieve the highest energy efficiency, which requires the lowest possible need for energy within the economic limits of reason (Omer, A. M. 2008).

Besides the operational energy requirements of buildings, it is important to consider two related energy issues. The first one is the transport energy

requirements as a result of the building and urban design patterns and the second one is the embodied energy or energy content of the building materials, equipment or systems being used (Omer, A. M. 2008).

Wedding, G. C. and D. Crawford-Brown (2007), This lack of a comprehensive set of metrics results in missed opportunities for altering substantial portions of the built environment whose design today will have significant environmental and social impacts for decades to come.

Environmental building assessment methods focus on criteria broadly divided into three major categories: global, local and indoor issues. These tools assess several main issues including resource consumption (such as energy, land, water and materials), environmental loading, indoor comfort and longevity the evaluation of design against a set of environmental (Ding, G. K. C. 2008).

Sustainable development concept must applied to project development, it involves the efficient allocation of resources, minimum energy consumption, low embodied energy intensity in building materials, reuse and recycling, and other mechanisms to achieve effective and efficient short- and long-term use of natural resources (Ding, G. K. C. 2008).

According to Pappu, A., M. Saxena, et al. (2007), in view of the importance of saving of energy and conservation of resources, efficient recycling of all these solid wastes is now a global concern requiring extensive R&D work towards exploring newer applications and maximizing use of existing technologies for a sustainable and environmentally sound management. Affect from growth of population, increasing urbanisation, rising standards of living due to technological innovations have contributed to an increase both in the quantity and variety of solid wastes generated by industrial, mining, domestic and agricultural activities. Use of industrial wastes and by-products as an aggregate or raw material is of great practical significance for developing building material components as substitutes for the traditional materials and providing an alternative or supplementary materials to the housing industry in a cost effective manner.

Table 1. Types and nature of solid wastes and their recycling and utilisation potentials

Sl. No.	Types of solid wastes	Sources details	Recycling and utilisation in building application
1	Agro waste (organic nature)	Baggage, rice and wheat straw and husk, cotton stalk, saw mill waste, ground nut shell, banana stalk and jute, sisal and vegetable residues.	Particle boards, insulation boards, wall panels, printing paper and corrugating medium, roofing sheets, fuel, binder, fibrous building panels, bricks, acid proof cement, coir fibre, reinforced composite, polymer composites, cement board
2	Industrial wastes (inorganic)	Coal combustion residues, steel slag, bauxite red mud, construction debris	Cement, bricks, blocks, tiles, paint, aggregate, concrete, wood substitute products, ceramic products
3	Mining/Mineral waste	Coal washeries waste, mining overburden waste tailing from iron, copper, zinc, gold, aluminium industries	Bricks, tiles, lightweight aggregates, fuel
4	Non hazardous other process waste	Waste gypsum, lime sludge, lime stone waste, marble processing residues, broken glass and ceramics, kiln dust	Gypsum plaster, fibrous gypsum boards, bricks, blocks, cement clinker, super sulfate cement, hydraulic binder
5	Hazardous waste	Metallurgial residues, galvanised waste, tannery waste	Cement, bricks, tiles, ceramics and board

Resources: Pappu, A., M. Saxena, et al. (2007).

Use of some of the industrial wastes as a cementitious materials/raw materials or additives could be realised in manufacturing blended cements, concrete, bricks and aggregates. This would contribute to the control and reduction of release of undesirable gases and pollutants to the environment. The new and alternative building construction materials developed using agro-industrial wastes have ample scope for introducing new building components that will reduce to an extent the costs of building materials (Pappu, A., M. Saxena, et al. 2007).

Accordingly to Paul and Taylor 2007, of particular import to corporate customers is the indoor environmental quality (usually measured in terms of occupant comfort) of a building because there is evidence that links comfort to satisfaction and productivity. Thus, with regard to the link between green buildings and indoor environmental quality (i.e., comfort) it can only be said that the available evidence is weak and that, if there is a link, it can most likely be attributed to

personal control of ambient conditions. It now needs to be established whether there is a reason to believe that comfort is linked to satisfaction.

Omer A.M. (2008) said if green buildings employ low-toxicity finishes and furnishings, it may be that their air quality will be perceived as better than that of conventional buildings. Common green building features likely to influence indoor environmental quality include :

- Advanced ventilating and mechanical systems to increase air flow and reduce occupant contact with air borne microbial agents;
- Selection of building materials and furnishings that have low toxicity;
- Increased use of daylighting to reduce energy demands and enhance interior lighting quality;
- Inclusion of high quality, energy efficient lighting to reduce computer glare and increase visual comfort;
- Increased contact with the natural environment through more open views to the outdoors (also associated with daylight) and through the inclusion of plants indoors for psychological reasons and for air quality enhancement;
- Greater attention to construction, maintenance and operation of buildings to reduce build up of microbial agents, especially in HVAC systems and construction materials.

For instance, a building owner may wish his building to perform well from a financial point-of-view, whereas the occupants may be more concerned about indoor air quality, comfort, health and safety issues. Separate indicators, or benchmarks based on a single criterion, have been developed to monitor specific aspects of environmental building performance such as air quality and indoor comfort (Ding, G. K. C. 2008).

In modern architecture, windows play an important role in influencing energy demands on heating/cooling loads and artificial lighting. For years, the interrelation between window design and thermal/visual performance of buildings has been a subject of extensive investigation. The angular selectivity nevertheless has to be specifically tailored for each location and each orientation of the facade, in order to maximize its benefit. The system consists of a reversible window frame holding two glazing components: a transparent glazing that provides a weatherproof seal and an

absorptive glazing having top and bottom vent openings for airflow (Chow, T. T., K. F. Fong, et al. 2007).

Chow, T. T., K. F. Fong, et al. (2007), was found by using the optimum PV window configuration, the related electricity consumption was found reduced by 55% compared to the single-glazed window without lighting control. An extension of the above work is the study of PV ventilated glazing technology for applications in warm climate, in that the absorptive glazing of the solar-screen ventilated window can be replaced by a normal float glass pane attached with a solar cell layer.

Solar heat gain via fenestration, contributes to a significant proportion of the building envelope cooling load. Moreover, owing to the small angle of incidence, direct sunlight can be excessive for east-facing windows in early morning and west-facing windows in late afternoon. In Hong Kong, external shading devices were not popular because many large scale prestigious building projects in up-market commercial districts had a tendency to use curtain walling (Li, D. H. W., T. N. T. Lam, et al. 2007).

Some of the features that relate to the indoor environmental quality of a building would include natural ventilation and the use of low-toxicity finishes and furnishings (resulting in better air quality), natural lighting for a better quality of illumination, operable windows and fans that enable personal control over ambient conditions and access to outdoor sounds, and recycled materials that could be considered to provide a more serene and aesthetically pleasing interior. A new ceiling was fitted to the building to improve the lighting, temperature, and noise within the mail sorting room. (Paul and Taylor 2007).

The prevalence of air-conditioners has brought great pressure upon energy, electricity and environment. Consequently, solar-powered air-conditioning system would be a perfect scheme because it not only makes the best use of solar energy, but also converts low-grade energy (solar energy) into high-grade energy for comfort. In addition, it is meaningful for the energy conservation and environment protection (Zhai, X. Q., R. Z. Wang, et al. 2007). Li, D. H. W., T. N. T. Lam, et al. 2007 said in subtropical Hong Kong, most of the electricity is used for creating a thermally and visually comfortable built-environment through air-conditioning and artificial lighting. Then the initial, running and maintenance costs of a building due to

a smaller HVAC plant capacity and peak electrical demand can be lowered. Daylight makes an interior space look more attractive.

According to Bulchholz (2007), looming scarcities and associated social, economic, and ecological impacts associated with conventional sources of modern energy like fossil fuels or nuclear energy are again pushing the development of the renewable energy sources, namely biomass, hydro, wind, and geothermal. Consequently, it is of great importance in the building field to reconsider the building structure and exploit renewable energy systems, which can minimize the energy expenditure and improve thermal comfort (Zhai, X. Q., R. Z. Wang, et al. 2007).

Zhai, X. Q., R. Z. Wang, et al. (2007), said solar energy is abundant and clean; it is meaningful to substitute solar energy for conventional energy. Solar energy therefore has an important role to play in the building energy system. The prevalence of air-conditioners has brought great pressure upon energy, electricity and environment. Consequently, solar-powered air-conditioning system would be a perfect scheme because it not only makes the best use of solar energy, but also converts low-grade energy (solar energy) into high-grade energy for comfort. In addition, it is meaningful for the energy conservation and environment protection.

Solar cooling systems can be classified into three categories: namely, solar sorption cooling, solar-related systems and solar mechanical systems, there into, the former two systems are based upon solar thermal utilization and the latter one utilizes a solar-powered prime mover to drive a conventional air conditioning system (Zhai, X. Q., R. Z. Wang, et al. 2007).

Renewable energy utilization (REU) is one of the most important aspects of green buildings. End-use energy consumption in buildings, such as cooling energy consumption, heating energy consumption, hot water energy consumption, lighting electricity consumption as well as household appliance electricity consumption, can be supplied by conventional energy systems (CESs) or renewable energy systems (RESs) (Xia, C., Y. Zhu, et al. 2008).

According to Ding, G. K. C. (2008) said replacing an existing ventilation system by installing more windows to allow for natural ventilation and daylight may be impracticable, difficult or expensive to facilitate. The environmental assessment methods have predominantly been applied to new construction, but refurbishment

and maintenance of existing buildings are also an important part of a sustainable future.

Lange E. S. Hehl-Lange, et al. (2007), their results suggest that measures for landscape improvement such as planting new fruit trees or hedgerows in most cases will benefit the perceived value of green space qualities not only in one dimension but equally in terms of esthetic, recreational and nature conservation value.

Problem Statement

Despite the good examples shown by these developed countries on how to build houses sustainably, Malaysia are relatively behind so far in this aspect. There is no denying the fact that, the technology to build sustainable houses are there for the Malaysian developers and construction professionals to harness. Why there is such reluctance to embrace sustainable residential buildings? Are they expensive to build? Are our architects and engineers not technology-ready yet? Or ultimately, are our house buyers do not want them? Or if they do want to buy these sustainable houses, to what degree of 'sacrifice' do they want to make, as sustainable houses might come at appreciably higher prices than the conventional houses. These are the conundrum that had beset the drive by certain quarters to promote sustainable housing in Malaysia.

The one big question behind all these discussions is actually this: 'In the current residential property market, if a property developer decides to mass-develop sustainable houses and offer it to the marketplace, would there be enough demand from the buyers to make such a project financially feasible?' That question can only be answered with certainty when the whole project is presented to the potential buyers and see how they respond to the new product offering, i.e. the sustainale housing. But such a hit and miss strategy cannot withstand the test of project financiers in the form of commercial banks and sophisticated investors. One way to minimise the risk of failure in the developer's part, and at the same time putting them at ease with their financiers is by conducting a study to identify the green home needs of the housebuyers, and then identify the right concepts for the green homes. By carrying out such an exercise, government officials, property developers and construction professionals will understand their buyers better, and know to a degree

of certainty, whether a new 'niche' they are about to carve out in the already crowded out property market is indeed a winner.

This study attempts to put into effect a marketing research that looks into the possibility of mass-developing green homes in Malaysia. The research will only look into identifying the housebuyers' green homes needs, and identifying the right concepts for the homes. Hence, both sides in the market will be studied: the providers (consist of property developers, contractors, and construction consultants) and the house buyers. For instance, the study will investigate the capacity of Malaysian property developers to build sustainable housing that can meet the needs of the potential buyers. In the same manner, investigations would be carried out to canvass the opinion of these buyers on their ideal green homes, in other words, determining what their needs are. It is hoped that this study could shed some light into the buying behaviour of housebuyers with regards to green homes.

METHODOLOGY

The methodology used in this research would be based on marketing research framework. It is important to build these green homes with certain knowledge that it is going to be accepted by the new segment of housebuyers in the property market. Given the problems of many property developers who build their projects based on 'hunches' rather than from their marketing intelligence, the marketing research proposed here would provide a set of 'informed knowledge' or intelligence that could be used as a reference point by the government, property developers, contractors, and construction consultants in introducing the green homes to the market. The nature of buyer-developer relationship in property development is one of producer-led, where the supply and take-up of the housing is regulated by the activities of the supply industry (i.e the developer).

Marketing research is defined by the British Institute of Management (1962) as "The systematic gathering, recording and analysing of all facts about problems (or opportunities) relating to the transfer and sales of goods and services from producer to consumer." The whole framework seeks to translate the operational characteristics of the housing market into a structured appraisal of requirements for energy-efficient buildings and green homes, and to related these opportunities to supply green homes that would be accepted by the housebuyers. The rule of thumb here says, "No green homes development should be undertaken without proper

analysis of the new 'niche' market (i.e. the green homes) about to be carved out by the developers".

CONCLUSION

Green homes or green building concept the most important thing make sure our life and future generation more comfortable and live in harmony nature. This research will get the right information with conduct a survey to housebuyer which can get the needs and requirement of housebuyer for green homes concepts. Now days Malaysia was far behind other country to solve climate change in the world through built the house. From the research hope can help the house buyer get a house which understand their need and make more save for long-term.

REFERENCES

Alameda County Waste Management Authority (2002) New Home Construction: Green Building Guidelines, *Alameda County Waste Management Authority*, California USA.

Appu Haapio, Pertti Viitaniemi 2008 "A critical review of building environmental assessment tools" *Environmental Impact Assessment Review*.

British Institute of Management (1962)

Buchholz, T. S., T. A. Volk, et al. (2007). "A participatory systems approach to modeling social, economic, and ecological components of bioenergy." *Energy Policy* **35**(12): 6084-6094.

Chow, T. T., K. F. Fong, et al. (2007). "Performance evaluation of a PV ventilated window applying to office building of Hong Kong." *Energy and Buildings* 39(6): 643-650.

Ding, G. K. C. (2008) Sustainable construction--The role of environmental assessment tools. *Journal of Environmental Management,* 86**,** 451-464.

Heerwagen J, Z. L. (2005). "The human factors of sustainable building design: post occupancy evaluation of the Phillip Merril environmental center." Retrieved 2 June, 2008.

Krüger, E. and B. Givoni (2007). "Outdoor measurements and temperature comparisons of seven monitoring stations: Preliminary studies in Curitiba, Brazil." *Building and Environment* 42(4): 1685-1698.

Lange, E., S. Hehl-Lange, et al. (2007) "Scenario-visualization for the assessment of perceived green space qualities at the urban-rural fringe." *Journal of Environmental Management***.**

Li, D. H. W., T. N. T. Lam, et al. (2007) "Lighting and cooling energy consumption in an open-plan office using solar film coating." *Renewable Energy*

Omer, A. M. (2008). "Green energies and the environment." *Renewable and Sustainable Energy Reviews* 12(7): 1789-1821.

Pappu, A., M. Saxena, et al. (2007). "Solid wastes generation in India and their recycling potential in building materials." *Building and Environment* 42(6): 2311-2320.

Paul, W. L. and P. A. Taylor (2007). "A comparison of occupant comfort and satisfaction between a green building and a conventional building." *Building and Environment*

Vouvaki, D. and A. Xepapadeas (2007) "Changes in social welfare and sustainability: Theoretical issues and empirical evidence." *Ecological Economics*

Wedding, G. C. and D. Crawford-Brown (2007). "Measuring site-level success in brownfield redevelopments: A focus on sustainability and green building." *Journal of Environmental Management* 85(2): 483-495.

Xia, C., Y. Zhu, et al. (2008). "Renewable energy utilization evaluation method in green buildings." *Renewable Energy* 33(5): 883-886.

Zhai, X. Q., R. Z. Wang, et al. (2007). "Solar integrated energy system for a green building." *Energy and Buildings* 39(8): 985-993.