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## CLASSIFICATION OF FACTORS CONTRIBUTING TO SUSTAINABLE ISSUES ON SELECTED TRADITIONAL MALAY HOUSES AND BIO-CLIMATIC BUILDINGS

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### **Abstract**

*The concept of sustainable building incorporates and integrates a variety of strategies during the design, construction and operation of building projects. The use of green building materials and products represents one important strategy in the design of a building. Green building materials offer specific benefits to the building owner and building occupants which are reduced maintenance or replacement costs over the life of the building, energy conservation, improved occupant health and productivity, lower costs associated with changing space configurations and greater design flexibility. Thus, we must look back into the traditional way of house designed where the green impact play an important role in producing much sensitive structure with in-tune with the environment. The designers especially the interior designer with fair knowledge on environmental friendly designs or in today term as design with sustainable or green design factors must play lead role. Therefore, with the above goals, this paper become an initial platform trying to measure on the selected Malay houses and current bio-climatic designed structures sensitivity in applying interior and exterior design sustainable issues into the buildings. This study however will discuss on the comparative green design factors that addresses sustainability through an environmentally based research focus. Therefore, this study examines the environmental conditions of a continuing practice of the sustainable design from the early culture until now.*

**Keywords:** Sustainable Houses, Bio-climatic Buildings, Sustainable Interior, Sustainable Design.

### **1. Introduction**

One of the significant sustainable approaches to the traditional Malay house design is that the timber house rose on stilts. The first recording of this structure are known from the frieze of the Bayan in Angkor Thom near Angkor Wat, Cambodia in the 12<sup>th</sup> century and from Borobodur in Java Island, Indonesia. Angkor Wat and Borobodur are within the geographical distribution of the stilt house; it spreads from Indochina through Thailand, Malaysia to Indonesia and on to New Guinea or even in the Pacific Islands. The stilt construction distinguishes it from the rural Chinese house, which is always built firmly resting on the ground. The stilt construction also provides protection against rodents, snakes and unwanted intruders from the animal kingdom, and during heavy rain and floods, it sustainably keeps the living space dry. The clean columns underneath the floor, usually made of highly durable local timbers like *chengal* (*Neobalanocarpus heimii*) allow easy visual inspection for galleries of subterranean termites; the major pest of the timber in the tropic. The Malay house is basically a post and lintel structure with sustainable building materials such as timber or bamboo walls and a thatched roof. Windows are plentiful; sustainably lining the walls and providing good ventilation and views for the house. The juxtaposition of the roofs of the house with different sizes and at different orientations creates an interesting visual form.

In term of the aesthetic value, the Malay house reflect the originality of the local culture and socio-economic. From a distance, the Malay house seems standing as an icon to the local architecture which has its own identity. The Malay house can say to be designed ecologically to balance with the local climate as what we call it today as sustainable designed. This sustainable designed feature house can be seen in the case study home located in the traditional village called Kota Aur, Pulau Pinang (Lot No. 910), north part of Malaysia (see Fig.1). With distance about 500 meters from the author house, the house is efficiently designed to suit the local climatic requirements using various ventilation and solar-control devices, and low thermal capacity building materials.

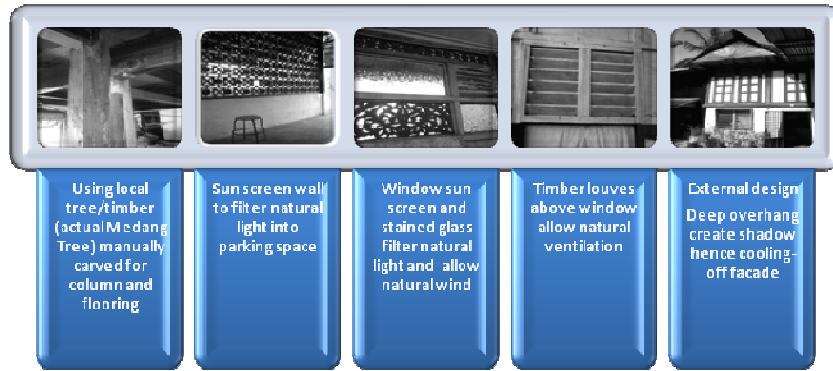


Figure 1: Case study 1: Traditional Malay house at Lot 910, Penang, Malaysia  
 Source: Roslan H Talib (2011)

Besides that, this well-keep traditional Malay house also been designed in a prefabricated system which is flexible and varied to suit the user needs. The house can be extended in an additional system. For example, the courtyard which is only found in this Malacca traditional house in Pondok Kempas (see Fig. 2) is an interior open space. It joins the ‘*rumah ibu*’ (main house) and the ‘*dapur*’ (kitchen) and its floor is usually a raised concrete platform. The wet and drying activities of the house are carried out here. It uses the last factor of the 6 Interior Sustainable Main Principles which is optimizing operational and maintenance practices. The Malay house enhances indoor environmental quality as in one of the U.S. General Services Administration’s Six Interior Sustainable Main Principals as shown in the detail of the Pondok Kempas house.

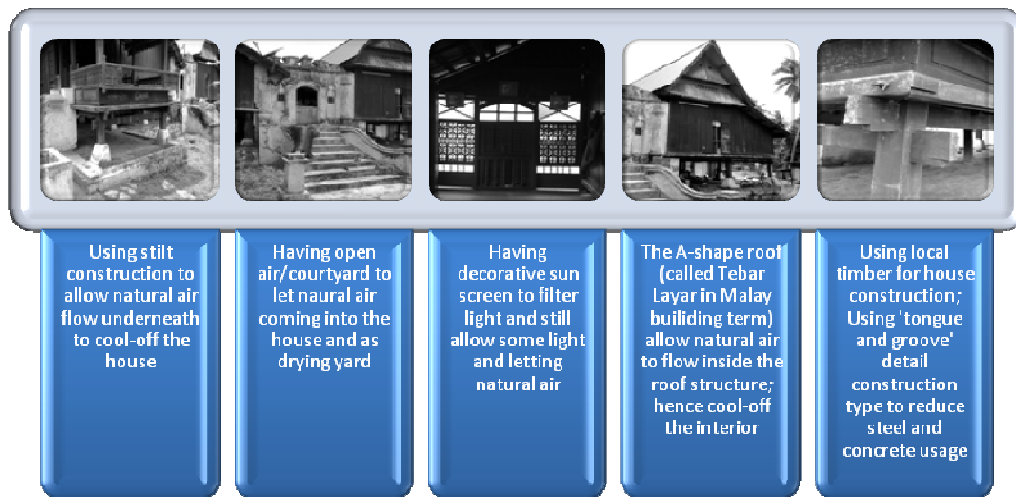


Figure 2: Case study 2: Traditional Malay house in Pondok Kempas village, Melaka, Malaysia  
 Source: Roslan Hj Talib (2011)

## 2. Methodology: Reusing Sustainable Interior Inputs of an Old Traditional Rural House

Malay traditional houses in Malaysia are located either in the north or south of the Peninsular, have its own aesthetic values. Using the home as a sustainable study course is very exciting. Having sustainable values in a traditional wooden house which is located in the state of Penang, makes this awesome more than just a traditional concept house and deserve an attention. Using as a case study house own by the author, this mostly wooden house nestled among the paddy field in a traditional village called Kota Aur (literally mean Bamboo Castle in English) located in Seberang Perai Utara district (Lot No. 747) (see Fig. 3). The house is passed down of two generations and having good number of green design features in it.

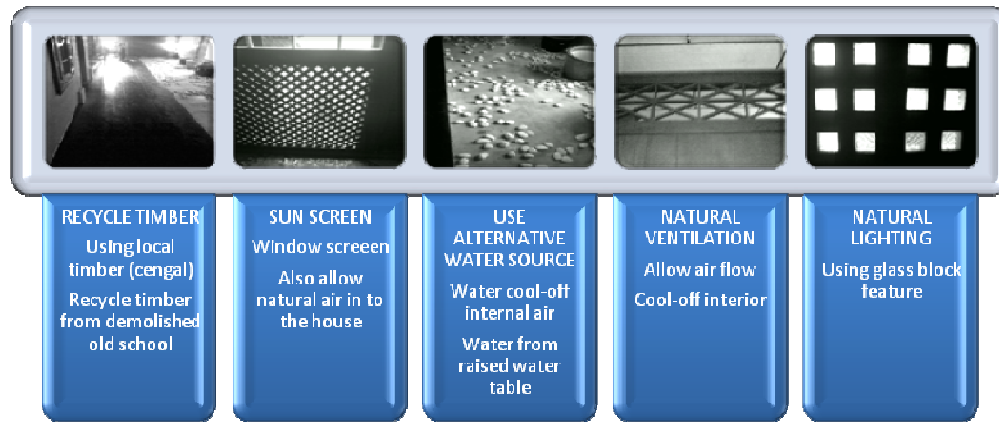


Figure 3: Case study 3: Traditional Malay house at Lot.747, Penang, Malaysia  
Source: Roslan Hj Talib (2011)

2.1 *Malaysian sustainable considered building case study 1: Guthrie Pavilion, Shah Alam. Completed: 1998 Architect: T.R. Hamzah & Yeang; Design Features*

The project is a 3-storey building with offices on one wing and a golf clubhouse on the other wing (see Fig. 4). The offices are the main office premises for Guthrie Property Development Holding Sdn. Bhd. (GPDH) [ a division of Kumpulan Guthrie Berhad]; a member of consider the biggest plantation related company in Malaysia. However this subsidiary company where the company's business is solely in real estate development. The building is intended to be a landmark building and to be the most prestigious building visible from the highway as visitors approaching the locality (Yeang,2011).



Figure 4: The Guthrie building can be considered as the pioneer modern building in the tropic region to fully consider on implementing sustainable design issues through the bioclimatic approach design philosophy. The building is fully glazed for maximum views out and natural lighting.(Source: Roslan Hj Talib (2011)

2.2 *Malaysian sustainable considered building case study 2: Menara Mesiniaga, Subang Jaya, Selangor. Completed: 1992, Architect: T.R. Hamzah & Yeang; Design Features*

The first of two bio-climatic buildings is Menara Mesiniaga (see Fig. 5) that is the IBM headquarters in Subang Jaya near Kuala Lumpur. This structure is a high-tech, 15-storey corporate showcase on a convenient and visually prominent corner site. The singular appearance of this moderately tall tower is the result of architect Kenneth Yeang's ten-year research into bio-climatic principles for the design of medium-to-tall buildings (Yeang, 2011). Its tri-partite structure consists of a raised "green" base, ten circular floors of office space with terraced garden balconies and external louvers for shade, and is crowned by a spectacular sun-roof, arching across the top-floor pool. The building is an environmental filter, an analogy for synthesis and analysis. The Menara Mesiniaga is a built work that utilizes a basis of traditional Malaysian building models and their transition or evolution into modern principles. It is Yeang's vision of the tropical garden city and it uncovers the relationship of buildings, landscape and climate transforming the impact of high rise development in the ecosystem of a city.



Figure 5: In this building, the architect's ecologically and environmentally brilliant design strategies reduce long-term maintenance costs by lowering energy use as stated in the 6 Main Principle of Sustainable Interior factors.  
 Source: Roslan Hj Talib (2011)

### 3. Result and Analysis: Comparative Study in Graphical Analysis – Native Homes versus Bioclimatic Structures

It is interesting to have the comparing idea on the Malay traditional houses sustainable features with the modern sleek renowned bio-climatic towers. We also must address to a new attitude towards architecture that has to be nurtured and not just architecture for tropical Malaysia but for all other countries in different climatic conditions (A Rahman et al, 2009). By running through the 2009 LEED rating system done for the commercial interior and extracting only those points related to the studied buildings; interesting graph chart achieved. Generally, both building types having quite consistence pattern in applying the summarize three considered main green design features.

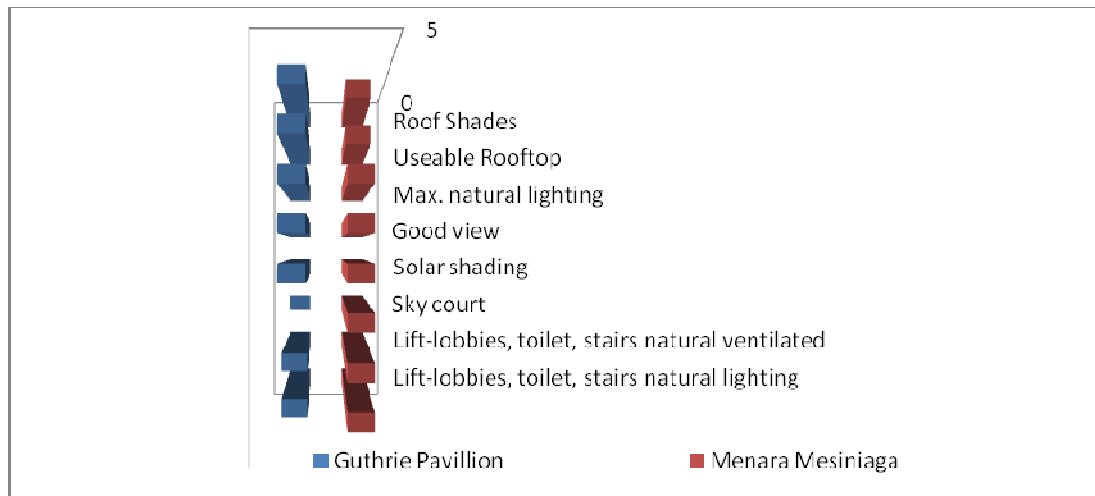


Figure 6: Green features on bio-climatic designed buildings.  
 Source: Roslan Hj Talib (2011)

Both, the houses and towers seems like they are efficiently been designed to adopt the tropical climatic requirements using various ventilation and solar-control devices and low thermal capacity building materials. Besides that, these traditional Malay houses and the bio-climatic buildings also been designed in a prefabricated system which is flexible and varied to suit the user needs. The houses and the towers can be extended in an additional system as mentioned to feature the sustainable Malay traditional houses before. Rating 4 getting the highest points for this analysis survey study (see fig. 6, Fig. 7 and Fig. 8).

At the moment, we apply our limited knowledge to preserve what we believe is worth having – according to our priorities, presumed importance or perceived needs (Bromberek, 2009). By understanding the value of having sustainable features on the traditional houses, one can produce green effect awareness in preserving or even consider ensuring the green ideas continuously been appreciated for time to come.

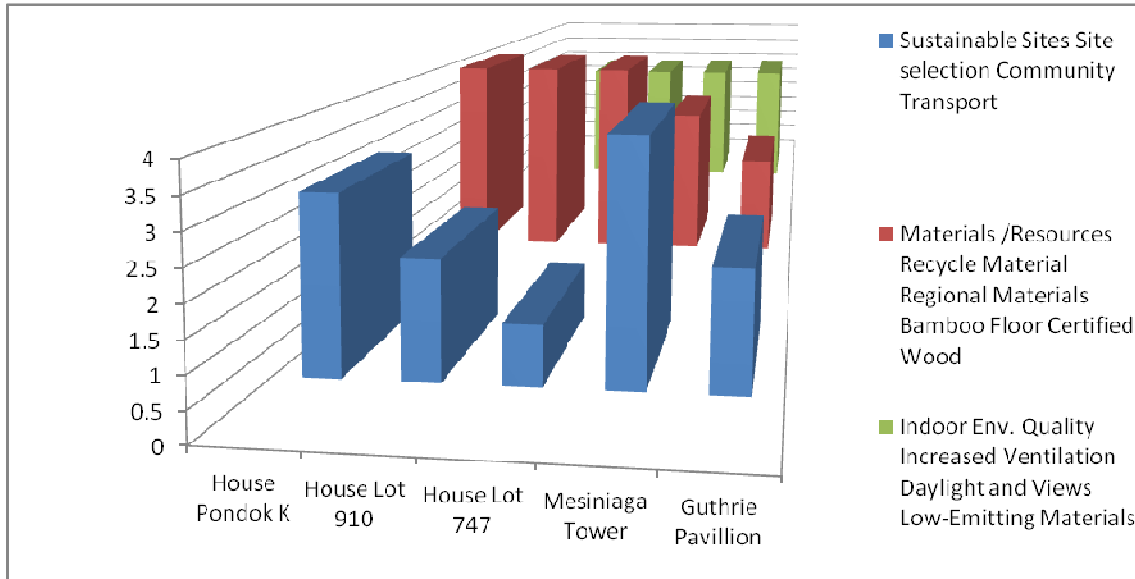


Figure 7: Comparative study using US LEED rating range: Traditional houses versus bio-climatic towers  
 Source: Roslan Hj Talib (2011)

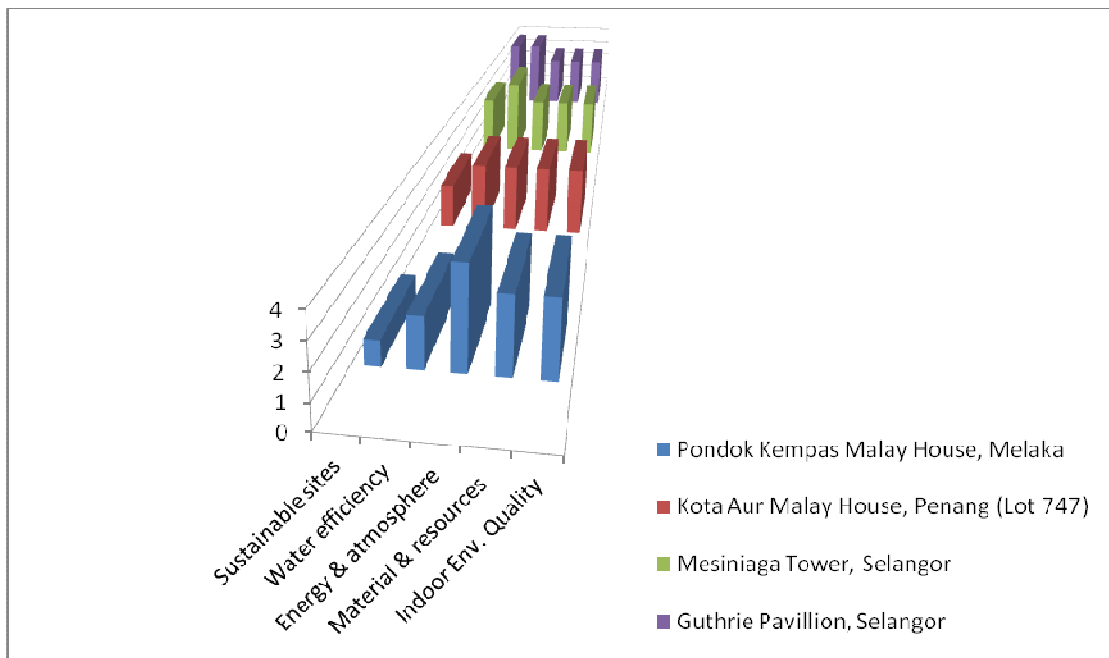


Figure 8: Using LEED rating in comparing traditional houses versus bio-climatic towers  
 Source: Roslan Hj Talib (2011)

#### 4. Conclusion

The green approach is simply ‘responsible design’. Having a responsibility to sustain life and land with every design decision made are the great things to do. With the emerging of the new millennium and having finished with numerous number of Government buildings in the new Federal Capital of Putrajaya that have green design features; the Malaysian Government advocating green building development and offering attractive incentives to those opting to go green, the market is expected to be flooded with green building opportunities (Talib, 2001). As we see bigger role playing by the Architects and the Interior Designer in contributing the process of designing the built environment; ‘green’ is an umbrella term for a myriad of elements considered as part of the design process. With the option we have now of having no planet B, future buildings must be designed with well



equip and well aware how important to have sustainable green design. Thus certain initial conclusion can be derived from the study where most of graphs indicated that by stressing the importance of the green design, buildings from traditional houses to modern structures can be guided and produced satisfied sustainable results.

Whether lifecycle analysis, reducing landfill, buying local, downsizing, salvage, re-purposing, heirloom design, anti-allergy, reducing VOCs or day lighting for productivity. These are to name a mere few. Sustainable interior design pulls away from changing trends and synthetic culture, returning to a more traditional, local and natural way of living. Furthermore, with the Federal Government policy in encouraging better living environment as shown in the Federal Government staff double storey terrace housing in new city like Putrajaya, Malaysia; looking into the comfort of having sustainable homes with sustainable interior feature can become the Malaysian trend lately (Talib, 2011).

To combine these elements and accomplish a design solution that offers a practical, functional, stylish and ethical interior, alongside the occupant's requirements can be quite a feat. In that challenge lays a new perspective. The holistic approach is to acknowledge that as humans we are only visiting the earth, we are not the owners. Together these offer a more intelligent method, one that respects our future. The research indicated that the up and down of the graphs lines giving better clues that the challenge in having sustainable traditional homes with loaded of green design attitude started much earlier without us noticing it and received better attention in designing future Malaysian houses. The effort of a prominent Malaysian architects, Dr Ken Yeang must be followed in ensuring his idea of having sustainable bio-climatic structures is getting world-wide attention and recognition has its root on the native designed houses as well.

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### **References**

- Bromberek, Z. (2009), *Eco-Resorts Planning and design for the tropics*, Arch. Press, UK.
- Rahman, A.M.A. , Samad, M.H.A., Bahauddin, A., Ismail, M.R. (2009), *Towards A Low-Energy building design for tropical Malaysia*, Penerbit USM.
- Talib, R. (2011), P.O.E. on Selected Government's Double Storey Terrace Housing Units in Putrajaya, Malaysia, *Journal of Asian Culture & Hist.*; Canada ,Vol. 3, No.1., 125-37.
- Talib, R. (2001), *Environmental Performance Study for the Government Precinct's Parcel C (Block C4) Building in Putrajaya*, Proc. Fourth International Symposium on Asia Pacific Architecture, Univ. Of Hawaii at Manoa, Sch. of Arch. April 2001, pp. 219 - 225.
- Talib, R., Sulieman, M.Z. (2011). *Survey in Implementing Sustainable Issues into Students' Interior Design Studio Project.*. International Journal of Research in Engineering & Technology (IJRET), Published by PSRC (Planetary Sc. Research Ctr), Vol.1 No.1 (on-line).
- Talib, R., Sulieman, M. Z. (2011). *Evaluation on Integrating Sustainable Ideas into Interior Design Students Studio Project* . International Journal of the Computer, the Internet and Management (IJCIM), Bangkok, Vol.19 No.2 (on-line).
- Yeang, K. (2011) Large buildings – Guthrie Pavillion. [Online] Available: <http://www.trhamzahyeang.com/project/skyscrapers/mesiniaga01.html>, accessed 05.22.11.
- Yeang, K. (2011) Skyscrapers – Menara Mesiniaga. [Online] Available: <http://www.trhamzahyeang.com/project/large-buildings/guthrie01.html>, accessed 05.22.11