Sustainable housing and urban construction

Life

Since the beginning of time, the builtenvironmenthas been an integral part in providing shelter needs for men, women and children. Maslow (1943) formulated that shelter is a basic requirement of humans. In the future, humans will have to construct sustainable shelter otherwise would they would risk depleting resources for subsequent generations. Construction is an example of a multitasking activity. The lifecycle of construction can be broken into phases. Achieving building sustainability in modern environment requires a better understanding of environmental impacts.

Impacts such asclimate change, associated costs, as well as utilising benchmarking scale to measure across a whole range of building types and occupancies. This report will discuss building sustainability, the constraints that stake holders of built environment face, and the role of architects in the process of constructing sustainable buildings. Conceptually, sustainability is allowing present generation to meet its needs without depriving later generations of a way to meet theirs.

According to Meckler (2004), building sustainability means to “ provide a safe, healthy, comfortable indoor environment while simultaneously limit the reduction of the earth’s natural resources”. Architects, with their unique position within the built environment, are well equipped to meet the challenges of sustainability in the built environment. The building and construction industry possesses a high ability to be innovative (Meckler 2004), and through this innovation that it would create new methods and processes resulting in constructing improved sustainable buildings that can be serve as subsequent year’s benchmark to beat.

The construction industry has invested in research and development into sustainability in order to gain a clearer understanding the effect of building on the environment and reducing the impact of buildings on the environment. The common goal is to be “ energy efficient”. Being energy efficient does not equate to being energy sustainable. The energy from the traditional fossil sources cannot be supplied without using further considerable amount of energy in supplying it.

The efficiency of the energy lifecycle starting from the raw extraction of resources, preparation, transport, conversion and distribution to application may be up to 20%. To equate this in simple terms is that it takes approximately 5kWh to deliver 1kWh of energy for consumption. So in order to consume 1kWh of energy, the real term consumption is actually 6kWh. Numerous studies internationally have shown that operational energy consumes the main amount of total energy use in buildings during a typical service lifep of approximately 50 years.

This accounts for about 85–95% of total energy use (Thormark, 2005). From a residential perspective, there should be a focus more on the sustainable development of the residential buildings and urban constructions. The fundamental reason new and more energy-efficient technologies continue to be ignored and the technologies that are applied rarely perform as efficiently as they should is because of a lack ofaccountabilityfor building energy performance in current building design and operation practices.

The building and construction industry in Australia has made significant progress forward in the last 5 years to improve their environmental

performance. This improvement has been in response to increased attention from local and state government policies regarding to Ecological Sustainable Development (ESD), as well as the availability of holistic environmental rating tools such as the Green Building Council of Australia’s Green Star rating tools. Architects factor in climatic variables into their thoughts as they design and plan houses, premises and buildings (Alnaser & Flanagan 2007).

In hot dry regions such as in the Northern Territory, the built environment should be planned compactly to reduce the amount of surfaces exposed to solar radiation. In warm humid regions such as in Queensland, buildings should be openly spaced to maximize air movement between individual buildings. This would reduce the structure operational energy consumption and maximise Green Star rating. Green building is a tremendous growth area in design, construction and building materials. Green building has gained momentum due to the rise in energy costs and cost of building materials.

The happy medium is somewhere between a combination of passive measures through optimal building design and active measures achieved through efficient mechanical system designed to control the indoor climate. These active measures mentioned above include utilizing renewable energy, such as solar energy, wind energy and geothermic energy, improving thermal performance of building structure, utilising daylight and energy efficient lightings, and developing new sustainable building materials (Thormark, 2005).

Another aspect of sustainability that is often neglected is social sustainability. Social sustainability can be thought of as qualitative indicators

that complement the development process. Some social sustainability objectives are to provide adequate local services and facilities to serve the development, to provide housing to meet the needs of the population, to provide high quality, habitable developments and where possible to preserve localcultureand heritage. In any actual development, there is a need for other supporting elements to make it appealing and sustainable.

An integral part of the development is to provide high quality energy efficient buildings for community activities such as musicals and outdoor space for open markets. By having such gatherings, the community will get a sense of ownership and will utilise the facility frequently. A salient aspect of sustainable development is to provide a mix of housing structures of all different types (Zhu & Lin, 2003). In order to achieve the objective of providing affordable housing; designs and construction must be of high quality and yet utilises minimal resources.

Wherever possible, cultural heritage should be preserved through the reutilising of local valued buildings. If cultural preservation is achieved, the architectural design for the developments will reflect local heritage and use local materials. According to Williams and Dair (2007), there are 9 commonly identifiable barriers to achieving sustainability. Some of these barriers are: 1. Sustainability measure was not considered by stakeholders 2. Sustainability measure was not required by client (includes purchasers, tenants and end users) 3. The sustainability measure cost too much (in some cases the investor would not fund)

Unless sustainability is on the agenda of the local planning government, stakeholders are unlikely to voluntarily put sustainability measures on their agenda. Stakeholders were simply bypassing sustainability issues altogether. As with most local government planning policies, there are strict guidelines regarding social objectives, such as meeting housing needs. If a policy is active at the forefront of development then they appeared on stakeholders' agendas. Many architects have the ability to succeed in achieving a higher star rating for energy efficiency for their built environment projects.

They have been doing so for a while. The challenges of sustainability in the future should not be construed as extra attachments to how architects have designed in the past. Architects have the inherent ability to go back to the drawing board and to reinvent the design process to reflect the buildings needed for the future. Architects have a vital role to play. They are a part of key decision making mechanism in the building and construction industry. Going forward, their role will be inextricably linked to producing sustainable outcomes.

There are many indicators for sustainable building design (Smith 2001). (a)Identifying possible sources to generate renewable electricity on location, i. e. like Building-Integrating Photovoltaic (BIPV). (b)Minimal usage of fossil fuel energy sources used during the lifetime of the building. (c)Ensuring that building management systems are user friendly simple to operate. (d)Implementing passive or active solar energy while employing heating and cooling systems which are fine tuned to the needs of the occupants with air-conditioning used only in exceptional circumstances.

As we progress into the future, the need to provide shelter increases due to population growth. The building structures needed for this growing demand have to be environmentally and socially sustainable. There is a global increase in awareness of the diminishing supply of traditional fossil fuel resources. Fossil fuels make up the core heating and cooling energy consumption presently. In order to achieve sustainability and leave the next generation able to meet their needs, there are short term increased economic costs as the transition from traditional dependent on fossil fuels to alternative energy sources.

These barriers have to be overcome and the role of the architect in the overall schema is extremely important. They possess the necessary design skills to adapt to the changing needs and produce sustainable commercial and residential . REFERENCES •N. W. Alnaser_, R. Flanagan (2007). The need of sustainable buildings construction in the Kingdom of Bahrain. Building and Environment 42 (2007) 495–506 •T. HARTMAN. (2008). A Vision for Energy Performance Integrating performance - monitoring initiatives to improve building sustainability. HPAC Engineering • May 2008 •Maslow, A.

H, (1943). A THEORY OF HUMANMOTIVATION, Originally Published in Psychological Review, 50, 370-396. 1943 •C. McCabe. (2006). Environmental Sciences andPollutionManagement. Sustainable building design in Australia. Eco-Architecture: Harmonisation between Architecture and Nature. Vol. 1, pp. 237-245. 7 Jun 2006. •M. Meckler. (2004). Achieving Building Sustainability through Innovation Engineered Systems. •L. Nervenga. Specifying for Sustainability. Architecture Australia 1904-2006 •FS Smith. Architecture in a climate of a change: a guide to sustainable design.

UK: Architectural Press, An imprint of Butterworth-Heinemann; 2001. •C. Thormark. (2005). The effect of material choice on the total energy need and recycling potential of a building. Building and Environment 41 (2006) 1019–1026 •K Williams & C Dair (2007). What Is Stopping Sustainable Building in England? Barriers Experienced by Stakeholders in Delivering Sustainable Developments. Sustainable Development Sust. Dev. 15, 135–147 •Yingxin Zhu, Borong Lin (2003). Sustainable housing and urban construction in China. Energy and Buildings 36 (2004) 1287–1297