SUSTAINABLE CONSTRUCTION WITHIN THE BUILT ENVIRONMENT: MALAYSIAN CONSTRUCTION INDUSTRY INITIATIVES

Zuhairi Abd. Hamid¹, Mohd Khairolden Ghani², Maria Zura Mohd Zain³

¹ Executive Director, Construction Research Institute of Malaysia (CREAM), CIDB Malaysia
² Manager, Construction Research Institute of Malaysia (CREAM), CIDB Malaysia
³ Manager, Construction Research Institute of Malaysia (CREAM), CIDB Malaysia

ABSTRACT

The construction industry and its related activities are responsible for a substantial amount of global resource use and waste emissions. As buildings and other structures are planned to last for 50 to 100 years, future changes in climate change derived from these constructions should be given a high priority. Through anticipating future climatic developments, engineers can minimize their negative effects and benefit from their positive impacts. The combination of efforts from sustainable and built environment and all actions derived from construction will protect the earth from manmade disaster. Construction sector could not be marginalized from the issues on environment. Creating a sustainable construction in Malaysia requires a strategic approach that will benefit the country’s current and future consideration looking issues related to economic, social, environment and quality of life. Construction Industry Development Board (CIDB) Malaysia is obliged to take this issue on board through its Construction Industry Master Plan initiatives under Strategic Thrust 3: Strive for the highest standard of quality, occupational safety and health and environmental practices. This paper discusses the role played by CIDB Malaysia to set out an agenda and a strategy for action to attain current and future sustainable construction in the built environment.

Keywords: construction industry, built environment, strategic, sustainable construction

1.0 INTRODUCTION

The construction industry contributes important elements to Malaysian socio-economy. The output of construction is worth RM 50 billion a year and accounts for 3-5% of Gross Domestic Products (GDP) and provides employment for around 800,000 workers (CIDB News, 2009). For many years it has created important roles in improving the quality of life for Malaysian through multiplier effects to other industries. In this respect, physical development solely would not give the guarantee to pursuit the quality of life for future generations. It must also be able to develop and utilize resources with most effectively and competitive and sustainable economy. The word sustainability is widely defined as meeting the needs of today without compromising the ability of future generations to meet their needs. While sustainability in construction means creating the balance between short term goals with the long-term goals of the projects that protect the environment and natural resources (CIDB News, 2009). Thus the main objective of sustainable development is to ensure a quality life for everyone, present and for future generations.

This paper discusses the role played by CIDB Malaysia to set out an agenda and a strategy for action to attain current and future sustainability environment. The policy set by the government, R&D innovation, the domestic skills development and construction capability, are all fundamental to the infrastructure that will consolidate and drive the nation’s economy forward.
2.0 CLIMATIC CHANGE AND GLOBAL CHALLENGES ON BUILDING SUSTAINABLE BUILT ENVIRONMENT

Climate change is the result of a great many factors including the dynamic processes of the Earth itself, external forces including variations in sunlight intensity, and more recently by human activities such as construction, mining and others (Wikipedia, 2009). The global effects of carbon emissions and climate change are clear. It is clear that such development contributes significantly to climate change and the increase in carbon emissions. The formation of the Ministry of Energy, Green Technology and Water is timely to address the effects of climate change and the need of green and sustainable environment (New Straits Times, 22nd May, 2009).

Figure 1: Flow of information and flow of action within the climate change problem (Smith, 2003)

Figure 1 shows the flow of information and the flow of action within the climate change problem. It starts with emissions and changes in atmosphere concentrations and carbon dioxide and other greenhouse gases produced from industrial and other sources (Smith, 2003).

The flow of information requires a balance between economic growth, social expansion and environmental protection to preserve the earth. The climate change has a lot to do directly or indirectly with nature and the people by altering the composition of the global atmosphere (New Straits Times, 5th June, 2009). The gas emissions could be reduced by using fossil fuel more
efficiently for industrial processes or electricity generation. These factors had attributed to the effect on resources, economy and community in the construction.

3.0 ISSUES AND CHALLENGES IN MALAYSIAN CONSTRUCTION

In a developing country like Malaysia, the sustainable construction trend tends to focus on relationship between construction and human development and marginalizing environmental aspects. However, in light of the severe environmental degradation experienced by most of the developing countries, construction industry cannot continue to ignore the environment (Begum, 2005).

Environment encompasses physical and non physical medium such as air, water, solid waste/land and also noise pollution. Construction sector could not be put aside from the issues on environment. The construction with exploitation of natural resources such as forest for timber, housing and industry without proper control contributes to the environmental problems (Ibarahim, 1999). Many of environmental issues that occur in our country are due to lack of environmental considerations in the exploitation, development and management of resources as well as lack of control of pollution resources. These issues if not tackled strategically will further aggravate and exert challenges towards sustainable construction in the following way (CIB, 2002).

i) Major concern challenges on sustainable construction are the mobilization of resources in order to support research, technological changes and feasibility studies. The sharing of research and educational activities must be taken on board right from government, universities and other private sector related industries (CIB, 2002),

ii) Environmental issues on construction are becoming more complex. The pursuance of environmental protection must be balance with the need for economic development (CIB, 2002),

iii) The use of environmentally appropriate technologies with concern on energy efficiency and full commitment to waste recycling and pollution should be practiced by construction players (CIB, 2002),

iv) Emphasis also must be given to the integration of environmental in all project planning and implementation. In this respect, usage and application of information, communication and technology (ICT) in leveraging skills should be introduced to the construction players (CIB, 2002),

v) Construction also has to reduce usage of its resources through material consumption, construction costs and wastage rates (CIB, 2002). It can be successful being done by way of education, site planning, management and design practices and adoption of new technologies,

vi) In global environmental sustainability, there is need for construction players to leverage socio-economic through equitability which stipulated in Kyoto Protocol which requires a substantial reduction in greenhouse gas emissions (CIB, 2002).
vii) Improving the quality of the construction process and its products. A first step towards sustainable construction is to improve the quality of construction products and the efficiency and safety of the construction process.

Malaysian construction industry players need to take a holistic approach along the construction value chain activities in performing their duties. Wider spectrum coverage within construction fraternity itself including societies, workers must work together towards sustainable construction in future.

There are a lot of rooms for improvement in the Malaysian environment scene at large. We could learn from experience in Sweden that focuses to build sustainable communities by looking at four strategic challenges as follows (Ministry of Sustainable Development, 2006):

i) Balancing various interests in terms of physical planning, regional development and infrastructure, along with residential and city planning consistent with sustainable urban development. An overall challenge, both nationally and globally, is posed by demographic change as the result of migration, an ageing population, urbanisation (particularly in the metropolitan areas) and depopulation trends in most Swedish municipalities.

ii) Encouraging good health on equal terms requires laying the foundation for decent living conditions – access to gainful employment, decent workplaces, economic and social security, communities in which children can grow up safely, participation and codetermination.

iii) Prioritising broad-based initiatives aimed at eliminating health and mortality discrepancies among various social and economic groups. A clean environment and healthy lifestyles are also vital to improve public health that facilitates both national economic growth and more stable household finances.

iv) Encouraging sustainable growth implying economic expansion driven by dynamic markets, a forward-looking welfare policy and a progressive environmental policy. The Government's vision is for Sweden to eventually obtain its entire energy supply from renewable sources.

Issues on 3R (reduce, reuse and recycle) can be seen as a way forward for construction industry to move up in achieving sustainable development on the various environmental, social, economic and even cultural factors. In addressing these issues on construction and environment, efforts towards sustainable construction must be taken on board to restore between natural and built environments (Tse, 2001, Shen and Tam, 2002).

3.1 Construction Waste Scenario in Malaysia

Construction waste issue also has recently received greater attention in the country. The amount of waste generated gradually increase in response to the rapid growing population, urbanization and industrialisation (World Bank, 1999). The hindrance of the implementation is that the contractor does not practice source separation, source reduction, reusing and recycling in construction site and disposed their waste into landfill. The construction activities have produced a lot of waste from construction materials such as timber, concrete, steel, oil, grease and so on. The waste materials that are hazardous will give significant effects to the environment. Land will
be contaminated and subsequently underground water will be polluted. In the Malaysian context there is still lack of basic legislation and clear policies on construction waste management. The construction sector is not only to deliver buildings and infrastructure but to look in reducing the usage of resources, minimize pollution and waste. The construction industry players shall look forward on the efficiency of construction materials usage, minimizing wastage of materials and practicing good environmental management in the construction (CIDB News, 2009).

3.2 Challenges on Built Environment

Environment encompasses physical and non physical medium such as air, water, solid waste/land and also noise pollution. The loss of the original topsoil and vegetation removes a valuable filtering mechanism for storm water runoff. (Hassan, 2008). In 2006, more than six million tones has been generated which quarter was produced in the Klang Valley alone, the most affluent area in Malaysia (Yusoff, 2007). Today, solid waste issue is one of the biggest environmental problems in Malaysia (Hassan, 1991 and Nasir et al., 1995).

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4.0 THE WAY FORWARD ON MALAYSIA’S GREEN STRATEGIES

The Malaysian Government announcement on the creation of the Energy, Green Technology and Water Ministry to spearhead the country’s sustainability agenda in the recent cabinet lineup is timely in tackling all related green issues. The emphasis on creating green or environmentally friendly buildings was also highlighted during the launching of Green Building Index (GBI) by the Minister of Work recently shows the commitment from the construction industry especially from organizations like Association of Consulting Engineers Malaysia (ACEM) and Pertubuhan Arkitek Malaysia (PAM). Buildings will be awarded the GBI Malaysia rating based on six (6) key criteria below:

- Energy Efficiency
- Indoor Environmental Quality
- Sustainable Site Planning and Management
- Materials and Resources
- Water Efficiency
- Innovation

Government policies have been recognised as important instruments in driving the market for sustainable buildings. In Malaysia, there is currently no policy which mandates a sustainable building; the closest we have is the MS 1525:2007 which is the ’Code of Practice on Energy Efficiency and the Use of Renewable Energy for Non Residential Buildings (Ooi, S., 2007).
The National Policy on Environment seeks to integrate environment considerations into development activities and in all related decision-making processes, to foster long-term economic growth and human development and to protect and enhance the environment. The provision to adapt a green building concept is one of the new challenges in construction industry in Malaysia.

The way forward has to be a reactive and responsive among construction industry stakeholders. No one is to be in a state of denial but has to be progressively improved towards the betterment to ensure the earth is safe and sustainable for future generation.

4.1 Industry Strategies

Greater adoption and use of environment-friendly planning techniques, designs and “green” materials in property projects will go a long way towards promoting green practices in the country. It will be more effective if industry players voluntarily adopt green and environment-friendly designs and concepts in their projects rather than depending on legislation to make it mandatory for industry players to incorporate pro-environment design features in their projects (Star 23rd. May, 2009).

5.0 CONSTRUCTION INDUSTRY MASTER PLAN 2006-2015 (CIMP) INITIATIVES

Construction Industry Master Plan 2006-2015 (CIMP) has identified the future challenges on environmental aspect as mentioned in Strategic Thrust 3: Towards highest standard of quality, occupational safety and health and environmental practices. The demand on environmental sustainability is necessary to achieve and sustain economic growth and social development (CIDB, 2007a). A systematic effort is required to avoid undesirable environmental impacts and enhance ecosystem management. Among the major impacts associated with the industry are soil erosion and sedimentation, flash floods, destruction of vegetation, dust pollution, depletion of natural resources and the usage of building materials which are harmful to the human health.

The envisioned of Malaysian Construction Industry Master Plan 2006-2015 (CIMP) is to be a progressive construction sector that lies on sustainable development. Figure 2 shows the overall strategic thrusts in CIMP, its critical success factor (CSF) as well as its enabling recommendations. CIMP envisaged that sustainable on construction is vital to the construction players to achieve and sustain economic growth and social development (CIDB, 2007a).
CONSTRUCTION INDUSTRY MASTERPLAN 2006-2015

Strategic Thrust 1
Integrate the construction industry value chain to enhance productivity and efficiency

Strategic Thrust 2
Strengthen the construction industry image

Strategic Thrust 3
Strive for the highest standard of quality, occupational safety and health and environmental practices

Strategic Thrust 4
Develop human resource capabilities and capacities in construction industry

Strategic Thrust 5
Innovate through research and development and adopt new construction methods

Strategic Thrust 6
Leverage on information and communication technology in the construction industry

Strategic Thrust 7
Benefit from globalization including the export of construction products and services

Figure 2: Construction Industry Master Plan 2006-2015 (CIMP) Initiatives (CIDB, 2007a)
6.0 IMPLEMENTING STRATEGIES ON SUSTAINABLE DEVELOPMENT: CIDB’S INITIATIVES

The sustainable development requires a balance between economic growth, social expansion and environmental protection. In order to pursue sustainable development, the construction industry itself has to be sustainable and give emphasis to environmental matter in addition to economic gains and social obligations.

In 1999 CIDB had established a Technical Committee to look into developing good environmental practices in the construction industry. Technical Committee 9 on Good Environmental Practices in the Construction Industry (CIDB/TC9) comprises environmental experts from government agencies, professional bodies, academia and construction related associations.

The role of CIDB/TC9 is to develop standards to improve environmental in the construction industry and advise CIDB in the formulation of programmes to promote good environmental practices. The term of reference of TC9 is to identify, prepare and develop the Construction Industry Standard (CIS) and Good Environmental Practices in Construction Industry. CIDB/TC9 executes its mandate through the establishment of Working Group (WG). Figure 3 shows the strategic recommendation working group under CIDB / TC9.

7.0 RESEARCH AND DEVELOPMENT INITIATIVES
Currently there are six research projects on Environment and Sustainability managed by Construction Research Institute of Malaysia (CREAM), a research arm of CIDB. The research topics are as follows:

i. Construction Practices for Storm Water Management and Soil Erosion Control for the Construction Industry,

ii. Achieving Sustainability of the Construction Industry via International Environmental Management Systems Standard, ISO 14001,

iii. Waste Minimisation and Recycling Potential of Construction Materials,

iv. Materials Security And Waste Management for Industrialised Building Systems (IBS): Towards Sustainable Construction,

v. Environmental Management Plan in the Contract Tender Document of Construction Projects and

vi. Utilisation of Waste Materials for the Production of Concrete Pedestrian Block (CPB).

Research on Construction Practices for Storm Water Management and Soil Erosion Control for the Construction Industry are focusing towards developing good practices in these areas. Data and output from this project are being used in the various Working Groups for further development and some of the findings have been disseminated to the stakeholders via seminars and workshops.

Achieving Sustainability of the Construction Industry via International Environmental Management Systems Standard, ISO 14001 is aligned to prepare the Guideline on Environmental Management System for Construction Industry (EMSCI). This guideline is prepared and aimed to assist contractors to be ISO 14001 certified and looking into the proper environment management systems in the construction industry.

Research on Waste Minimization and Recycling Potential of Construction Materials has been completed in 2005 and handed over to the Technical Committee (TC) 9 under CIDB. Some of the document have been published and disseminate to industry players. TC9 is in the midst of consolidating the research output and will assign Working Group 6 to assist CIDB to prepare Guideline and Training Modules on Good Practices on Waste Management at Construction Sites.

Three other research namely Environmental Management Plan in the Contract Tender Document of Construction Projects, Materials Security and Waste Management for Industrialized Building Systems (IBS): Towards Sustainable Construction and Utilization of waste materials for the production of concrete pedestrian block (CPB) are still on going. These three projects are scheduled to be completed in 2008, 2009 and 2010 respectively. Upon completion, stakeholders are able to capture some of the local experiences as well as global practices on waste management and sustainable construction through lesson learned and technology transfer of best practices.

8.0 STRATEGIC RECOMMENDATIONS
The task to uphold sustainable construction in Malaysia is an enormous undertaking that require plenty of innovation and commitment from all concerned. Both through CIDB’s initiatives, R&D initiatives and other action oriented industry strategies have identified tasks for immediate attention, as well as tasks for the medium and long term. It is vital that the strategic implementation plan continues to develop tools and technologies and other enablers to lessen the impact on environment and lead the Malaysian construction to be sustainable.

The commitment from stakeholders, government authorities and legislators can transform the Malaysian construction industry into one that is not threat to the environment, but meeting the human need for development in harmony with the nature. The combination of CIDB’s initiatives and strategies documented in Strategic Recommendations for Improving Environmental Practices in Construction Industry (CIDB, 2007b) are recommended to be the strategic way forward to be adopted by all players. The strategies identified are summarized as follows:

i) Strengthening the Development Approval Process,
ii) Enhancing Law and Enforcement,
iii) Promoting Self-Regulation, reflecting the best regulatory practices which is necessary to achieve sustainable construction in future,
iv) Increasing Capacity and Public Awareness and
v) Addressing Knowledge Gaps.

The strategic direction, the implementation strategies and R&D participation have to be driven in congruent to ensure continuity and focused. It is envisioned that all initiatives mentioned need to be taken forward simultaneously at both the local and international level. Every stakeholder involved in the green initiatives must stand together and react as a team not as individual champion.

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