

## Green Architecture Movement in AEC: The Rethink

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### Abstract

This article seeks to raise awareness of issues relating to ‘green’ (sustainable) architecture in ASEAN countries. The pending establishment of the ASEAN Economic Community in 2015 is likely to stimulate increased economic activity, causing population movements and increases in the population of major cities with associated increases in energy consumption. The built environment will need to respond to these changes to enable a sustainable future. This article presents an overview of the current state of green architecture and sustainable design within ASEAN.

**Keywords:** *green architecture, sustainable, ASEAN*

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### 1. Introduction

Thailand and other ASEAN countries have been trying to work together to increase economic growth, cultural bonding and development, and social cooperation. ASEAN countries are preparing for the establishment of the ASEAN Economic Community (AEC) in 2015, and this economic agreement is expected to create opportunities at all socio-economic levels, as well as strengthen regional relationships along the lines of the European Union. A consequence of the growth will be increased regional energy consumption. There is likely to be an increase in inter-regional travel, and increased construction to handle denser population in big cities, creating urban development challenges, especially given that most construction will be residential and commercial office buildings. More energy will be wasted as a sacrifice to this international collaboration. This raises concerns relating to increasing city sizes, including the need for more awareness of environmental impacts, the imperative of reducing pollution, the need for more open spaces for leisure and the need to reduce urban heat island effects.

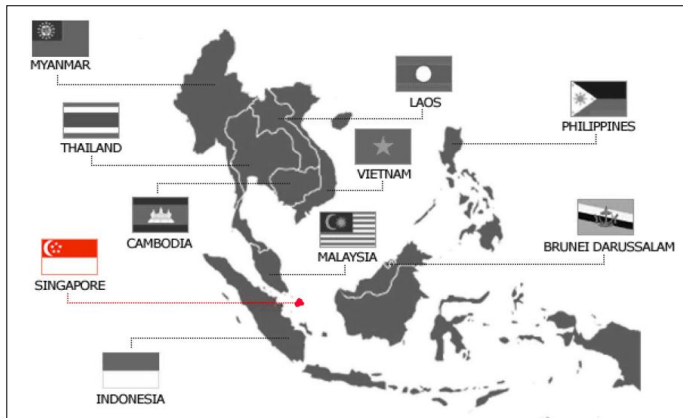
These issues are activating a more sustainable trend into building new infrastructure in the ASEAN region to cope with the emerging problems and to increase efficiency and sufficiency. This response is not new to the world. The innovative work of architects Frank Lloyd Wright and groundbreaking designs of R. Buckminster Fuller pioneered sustainable architecture a few decades ago although at the time their creations were viewed more as art than harbingers of a movement toward sustainability. Green or sustainable architecture is described as an architectural idea or structure that is environmentally responsible and resource-efficient. Green buildings aim to reduce waste, minimize energy use and provide a healthy environment for their inhabitants. This requires synergy through the design, construction, operation and maintenance of buildings. Though such buildings commonly have higher construction costs, these should be recouped through energy savings in years to come.

With the need to go green at every level of society, citizens need to be more environmentally conscious and more knowledgeable about the issues. Being eco-friendly encompasses using resources efficiently and understanding the need to conserve the finite resources of our planet. Despite the challenges facing us, green architecture is still not widely embraced in the region, notwithstanding its attractions and benefits. This article will review the progress toward greener architecture in major ASEAN countries and the AEC.



**Figure 1** Carbon emissions tons per capita 2007

## 2. Singapore



**Figure 2** Singapore in ASEAN

Singapore, a small country on the equator, is the regional master of sustainable land and structure development. Of all the ASEAN countries, Singapore leads the green movement. As a starting point, the island doesn't provide much to its people. Its resources are limited, starting with its small land area and insufficient quantity of potable water. Because it lacks the more abundant resources of other countries in the region, Singapore had to be more concerned about natural resource management. The competitive edge that Singapore has compared with other countries is born of the fact that it is a wealthy and developed country with limited land, so its people have a better sense of conservation and the need to optimize their resources. In other words, they tend to be more environmentally conscious out of necessity. As a consequence of the country's circumstances and assistance given under the British government, the design industry in Singapore works seriously toward sustainability and conservation for future development, making the green movement more high profile and successful there in both public and private sectors. It is supported by the government's implementation of a strong regulatory framework and financial incentives.



**Figure 3** Sentosa island, Singapore

Singapore started by optimizing its land use and implementing extensive land reclamation to build major infrastructure projects such as Sentosa Island with sand bought from Malaysia. The land reclamation is said to help conserve the area habitat. However, excessive land reclamation might have more negative effects on the natural environment than anticipated. It reduces an overpopulation problem, but may have caused other problems. Nevertheless, Singapore has thorough and intricate urban planning management, making it systematic and much more advanced than in neighboring countries.

By using easily manageable urban designs that do not harm the environment, the city-state is moving in a well-researched and predictable direction. Singapore is the hub of green architecture in South East Asia and one of the leaders in Asia. The country lacks vernacular architecture, so it is comparatively easy for it to move to a modern style of design and architecture. It doesn't have to preserve traditional buildings and infrastructure; architects there have freedom to be creative. The modern, green architecture movement is in sync with local values and in line with world trends.



**Figure 4** The Singapore Green Building Council's (SGBC's) logo

The Singaporean government has taken an active role in instigating academic research and development of green technology. The Singapore Green Building Council (SGBC), founded in October 2009 as a non-profit organisation, was established to help Singapore achieve greater sustainability in the architectural industry. The government Building and Construction Authority Green Mark Scheme, started in 2005, awards certificates to buildings that meet the Green Mark criteria and has been mandatory for new developments since 2008. Some well-known examples of such eco-friendly buildings are the National Library, Fusionopolis and the Solaris Building by Ken Yeang, who has been the mastermind behind the success of Singapore's green architecture movement. Many other buildings in Singapore are green enough

to pass the Green Mark criteria. Common features, for example, are reduction of interior heat from outside solar exposure while optimizing use of daylight because Singapore is hot and humid year round. Some buildings use recyclable concrete or other materials to save energy. Realtor CB Richard Ellis once said that, ‘Singapore impresses not just by the pace of green building adoption, or the sheer numbers of green buildings it now boasts, but also by the industry-leading technologies and practices being employed in the market.’



**Figure 5** Solaris Building, Singapore



**Figure 6** Fusionopolis, Singapore



**Figure 7** National Library, Singapore

The SGBC is a key factor in making Singapore a leader in this field. It is very pro-active in promoting sustainability in building and organizes events such as the annual Singapore International Green Building Conference (IGBC), Singapore Green Building Week (SGBW), and BEX Asia. These events are especially effective as they are open to the public, creating a free education platform encouraging greener communities and lifestyles. They showcase innovation in the industry, inspiring other companies and increasing the opportunities for collaboration. The council also holds “Project Green Insights” with Singapore’s Ministry of Education (MOE) to increase awareness about environmental issues in school. This is a good method of making citizens familiar with the issues at a young age, and promotes a greener outlook as they grow older. Basically, the organisation helps enhance professionalism and knowledge in sustainable development, a factor that is crucial in building a new generation who will be more supportive of such innovation and ideas in architecture.

### 3. Malaysia

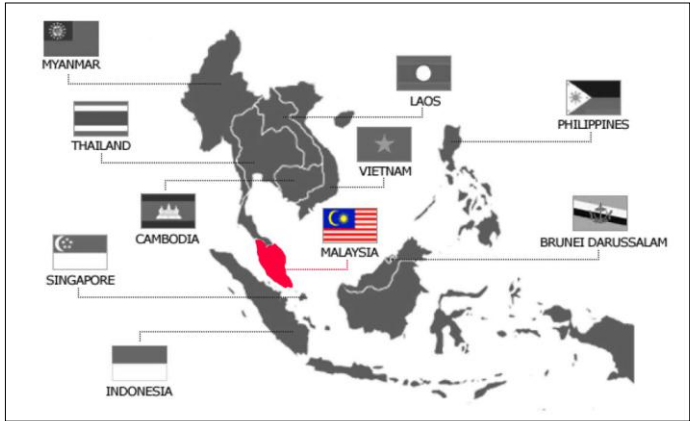


Figure 8 Malaysia in ASEAN



Figure 9 Mr. Ken Yeang

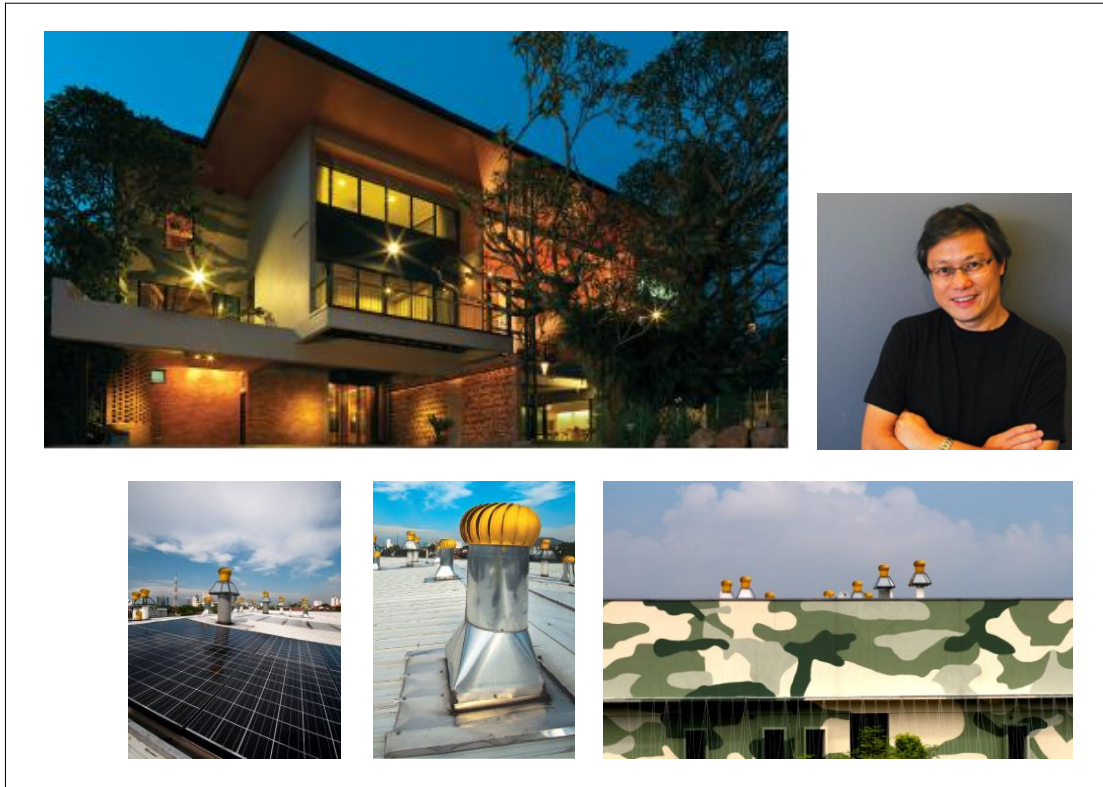
Malaysia has very different circumstances but is second to Singapore in the region with regard to progress toward greener architecture. Malaysia includes areas that receive a lot of rainfall with a more overtly tropical climate than Singapore. To build more sustainably, reduce energy use and simultaneously create comfortable living spaces suited to Malaysia’s climate, local architects have been led to blend vernacular architecture with contemporary styles. In the capital city, Kuala Lumpur, new high-rise building projects have sprung up as a consequence of recent economic growth. Ken Yeang, a Malaysian, is a prominent advocate of green architecture in the country while also being well respected in Singapore.



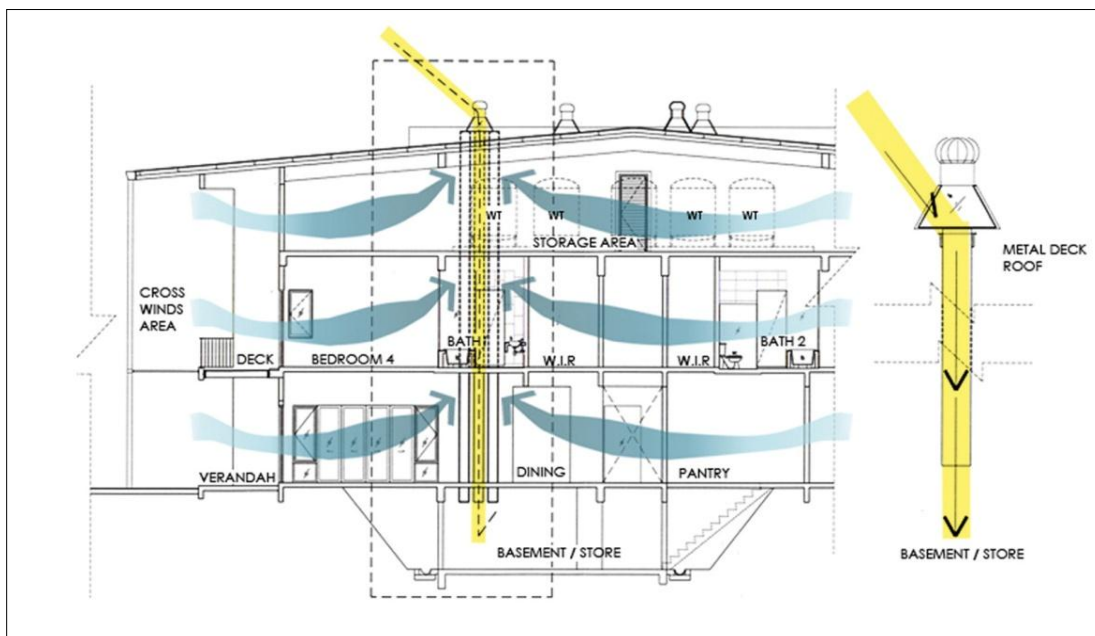
Figure 10 Green Building Index’s (GBI’s) logo

Similarly to Singapore, Malaysia has developed standards in evaluating and promoting green building techniques. The Green Building Index (GBI) is a profession-driven initiative to lead the industry to become more eco-friendly and is well supported by the construction sector. GBI is the only rating tool for the tropical zones other than the Singapore Green Mark scheme. The difference lies in that the Malaysian standard focuses more on water supply management and energy use, reflecting different national resources and thus priorities. The initiative also helps raises awareness amongst involved parties, such as architects, engineers, designers and contractors.





**Figure 11** S11 House: Malaysia's first GBI Platinum residential home – comprised with a specially designed wind turbine for ventilation system and solar cells to generate electricity, designed by Dr.Tan Loke Mun.



**Figure 12** S11 House: Architectural drawings

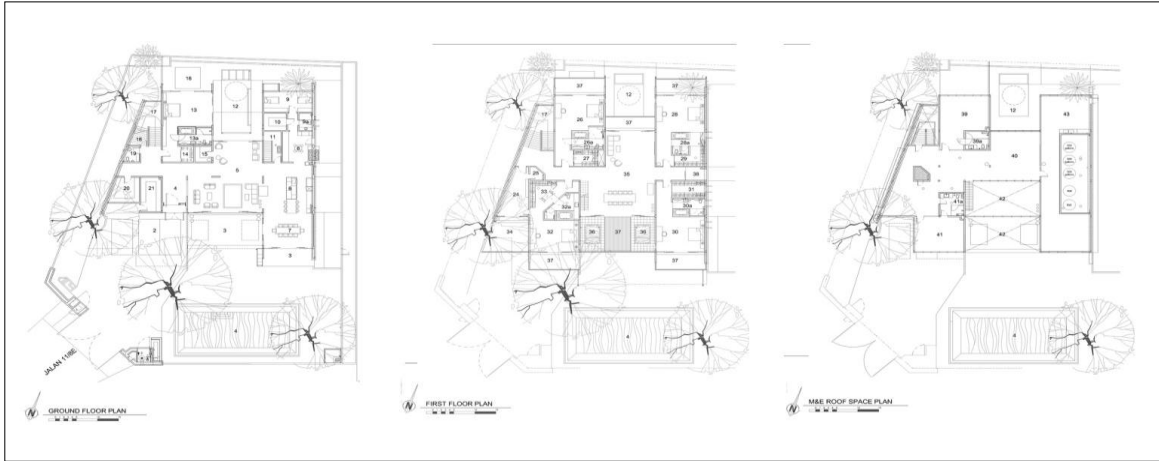


Figure 13- S11 House: Architectural drawings

Malaysia would arguably make faster progress if it developed a self-regulation framework alongside the government one, as the green initiative needs strong support from all sectors. Furthermore, awareness campaigns should be strengthened toward all levels of society. Campaigns to date have tended to focus on those at the top of the industry, paying less attention to the site workers who construct the buildings; the primary influence is directed at management. This limits the progress that can be achieved. Citizens should also be part of the education process to create a new generation of sustainability-prone minds. A comprehensive and integrated approach would lead to better future outcomes. As noted earlier, this kind of industrial movement needs support at all levels. Strong support for sustainable architecture has to be collective and mutual, and requires commitment from all sectors of industry and society.

As more money is invested into developing greener technology, it leads to developments that are more energy and water efficient: one of the green building eco-trends of this year. These include motion detector lighting for hallways and toilets, as well as waterless toilets. Many of these technological improvements are controlled by intelligent building management systems, which are getting more popular and optimise energy savings.

A number of notable green buildings in Malaysia and several green projects are at the planning and development stage. One is a megaproject that involves creating a green metropolis, Iskandar, in the south of Malaysia with an area three times that of Singapore. This is planned to be the core of Malaysia’s sustainable development plan as a super green and socially integrated city initiated by Malaysia’s Global Science and Innovative Advisory Council (GSIAC).

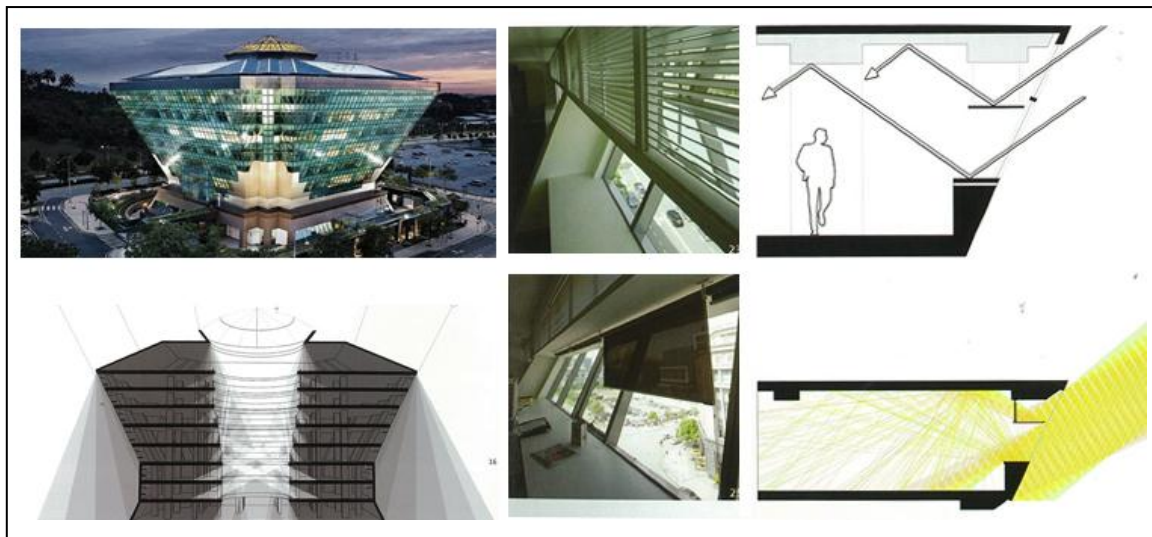


Figure 14 Iskandar project, Malaysia

The city will run on green energy to minimize pollution and enhance the lives of the people. The city plan includes renewable energy production and waste recycling. The grand ambition of the scheme may seem unachievable, but the project is underway. It is easier to create a new city than to recreate or renovate an existing one. Adopting sustainability at the infrastructure level and in urban development planning can encourage other stakeholders to follow suit. This eco-city will not be just a center of green technology. It aims to achieve social equality and stability, too. The plan is a great model for modern urban planning that will both heighten the quality of life and conserve energy. If it is successfully realized, this city of the future may set an example for urban developments around the world to imitate.

All this is easier said than done. It is one thing to create a city with a structurally green environment, but another to ensure that the population living and working there is correspondingly green.

This has to be achieved gradually through education and regulation. The people must believe in the need to go green: results can be measured through their actions. Unless the citizens feel involved, the city would just be a technological showcase that did not deliver on its promise.



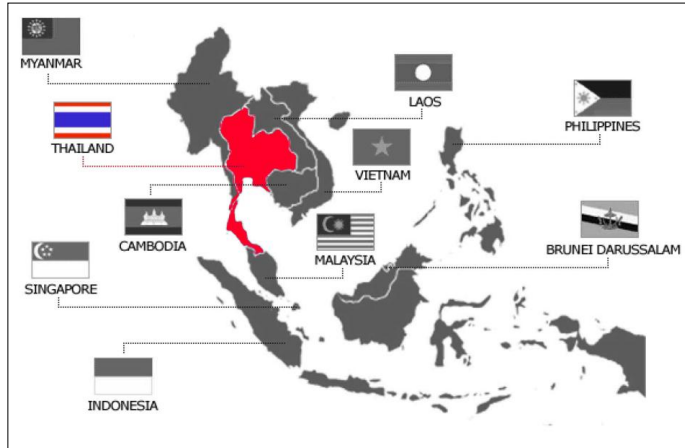
**Figure 15** Diamond Building, Malaysia

A specific structure worthy of note is the Diamond Building in Putrajaya, which was praised as the most energy-efficient building at the ASEAN Energy Awards (AEA) 2012. This building uses only one-third of the amount of energy used by a normal building, but its roof incorporates solar panels and recycles rainwater. It optimises the use of natural sunlight with a large central atrium, and uses coils embedded in the concrete floor slabs to keep the building cool. Interestingly, this award-winning building was designed by NR Architect with Thai architect Dr. Soontorn Boonyatikam. Solar panels have become a given in the design of all green buildings in the region.

#### **4. Thailand**

Thailand is an ideal hub for the AEC. It has plenty of land still available for development. However, such development needs to be carefully coordinated and regulated if it is to help guide Thailand toward a more sustainable future. With many diverse influences and a range of assessment tools in use, there is no commonly accepted understanding of what ‘green’ means. There is little in-depth appreciation of the pressing need to move toward a more environmentally friendly built-environment and lifestyle: more a vague feeling that ‘because it’s popular elsewhere, we should follow suit.’ Truly green buildings are not a high priority for most, in line with a widespread lack of interest in conservation and environmental friendliness. ‘Green’ is widely treated in a superficial way, as a marketing trick to add a surface gloss to a fundamentally conventional design.





**Figure 16** Thailand in ASEAN

However, Thailand does have its own sustainability measurement rating for buildings, called TREES (Thailand's Rating of Energy and Environmental Sustainability). This in time should encourage Thai architects to create designs driven from conception by a fundamental focus on sustainability, rather than a perceived need to pay lip service to a trend. In developing the TREES standard, Thai architects drew strongly on the well-known LEED (Leadership in Energy and Environmental Design) standard developed in the USA. Creating a Thai variation of the LEED concept makes good sense, as it can be adapted to suit the different climatic conditions, available locally resources and infrastructure conditions. TREES will provide a framework for structural consulting and will grant awards. TREES acknowledges that a green building doesn't necessarily need state-of-the-art materials or the most advanced technology. The key requirement is an appropriate design and a well-planned building management system. The initial cost for a 'green' building is usually higher than for a conventional one, but the payback over the life of the building generally makes it a sound financial investment. Research carried out in California indicates that a 2% investment to achieve LEED certification would save 10 times that amount over a building's lifecycle.

Some of the criteria TREES uses to evaluate deserving buildings include building management, site and landscape, water conservation, energy and atmosphere, materials and resources, indoor environmental quality, environmental protection and green innovation. Three levels of 'greenness' can be certified by the organisation: Platinum, Gold and Certified. TREES also published the Green Guide to inform present and future architects about building green. Workshops and seminars are held to highlight the importance of these issues and to educate people in the industry. The organisation aims to spread the idea of green building and encourage people to become more involved in the movement.



**Figure 17** Park Ventures, Thailand

Noteworthy green buildings in Thailand are mostly in Bangkok. Park Ventures, an office building in one of Bangkok's most commercial districts of, is certified Platinum by LEED. A key element of the building design is the use of triple-gazed low-E glass, which reduces the heating effect of sunlight on the building, making it more comfortable and greatly reducing the demand for air conditioning and the energy to provide it. Intelligent lighting automatically dims in response to ambient light levels and switches off when unneeded. A grey water system enables wastewater to be used for watering plants, which in turn improves the building's environment. All sanitary fixtures are water efficient, including sensor-activated taps and water-saving lavatories. The building is an excellent example of a green building to hold up to the new generation of Thai architects: innovative, aesthetic and eco-friendly. It has also managed to achieve a higher rental rate, demonstrating that eco-design can bring financial benefits.

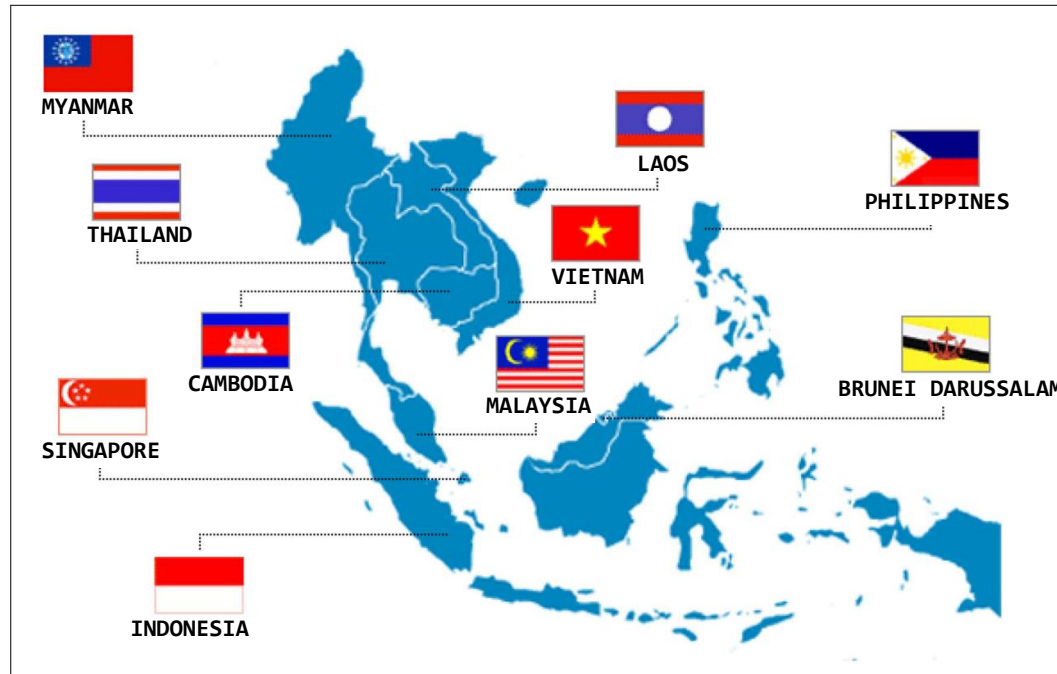


**Figure 18** Thanya Park, Thailand

Another good example of a green building in Thailand is the new outdoor shopping complex in Bangkok, Thanya Park, which claims to be the first and (so far) only Eco shopping park in Thailand. The building incorporates many trees, plants and open spaces that aid ventilation.

Green architecture is just starting to make an impact in Thailand, or at least in Bangkok. The key is to design green buildings that justify their additional costs by the lifecycle savings they will achieve and by the increased desirability that their eco-features generate (as in the case of Park Ventures). When the objectives of the eco-conscious architect and the commercial developer are brought into alignment in this way, then real progress toward a sustainably built environment can be made.

## 5. Other ASEAN countries



**Figure 19** ASEAN member countries

Unlike Malaysia or Singapore, which has adopted the British urban management system, the other ASEAN countries are far behind in embracing green concepts. They have just started their own national green standards after years of unstandardized methods that failed to capture any widespread support. They now mostly have plans and projects that are ready to be developed, but it will take time for environmental awareness to grow. Political instability, natural disasters and economic constraints may also limit progress toward eco goals.

In the Philippines, the first certified ‘green’ project began in 2011, the Net Metropolis. This is the flagship development of Philippine Green Building Council (PHILGBC) — a national not-for-profit organisation to answer to local environmental needs. The Net Metropolis will become an iconic landmark in the country’s main business district, which represents the country’s future. The chairman of the Net Group Jacques Dupasquier said, ‘As the Philippines is answering the call to go “green” in Southeast Asia, we needed a visionary who could solidify our spot at the front of the movement.’ The tower will feature passive external shading and high-tech glass to minimize solar heating, while the design optimises use of natural light. There will even be vertical-axis wind turbines on the roof.

The Philippines’ rating system, Building for Ecologically Responsive Design Excellence (BERDE), responds to the country’s environmental needs: another variant strongly influenced by the United States’ LEED system. BERDE has evolved from an internationally accepted green building system into a standard better suited to the region. As Christopher De la Cruz, Chairman of the PHILGBC observed, ‘As the rating systems from other countries didn’t apply to our tropical weather, laws, best practices, or realities, local industry clamored for its own green building system. The PHILGBC responded by facilitating a consultative and consensus driven process to create the Philippine Green Building Rating System [BERDE]. This was the best way to transform the market.’

Interestingly, even though the Philippines doesn’t have many completed green buildings, many people are enthusiastic about the green movement and have established a civic organization, Green Architecture Advocacy Philippines (Green AP), that is concerned about the environment and takes action by promoting sustainable development in the construction industry. The group generates positive responses via Facebook and through organising events and gatherings.

Brunei launched its Green Building Council (GBC) in May 2013 and is developing a new green policy. It is creating a rating tool, the Green Building Index, to provide a benchmark for future building developments in the country. Indonesia is similarly developing a green construction policy and established the Green Building Council Indonesia in 2009.

## 6. Conclusion

ASEAN countries still lag far behind the West in implementing green thinking in architecture and construction, but awareness is growing, especially and initially in Singapore and Malaysia. The environmental imperatives are different in tropical countries in the USA, where the leading international standard LEED was developed, and this has led to the creation of localised variants of green building standards. The key to future progress toward more widespread adoption of sustainable and eco-friendly buildings is the cost/benefit equation. If green buildings can be shown to provide an enhanced long-term return on investment, then they will become more attractive to developers. At the same time, if eco-awareness can be encouraged among the public, then public pressure for more environmentally friendly designs will provide an additional driver.

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