Towards Green Building Implementation in Indonesia: Lessons Learned from Singapore

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While green building (GB) implementation in Indonesia is still in its infancy, Singapore has long been recognized as one of top leaders in GB implementation in the world. With a sustainable vision of “greening 80% of all buildings in Singapore before 2030” and a national policy called “Green Mark Scheme,” it has successfully achieved more than 30% of the target in May 2016 with more than 2,700 buildings are Green Mark certified. The aim of this study is to explore lessons learned from Singapore’s GB implementation success story to be adopted in Indonesia. The objectives are to identify; (1) road map of Singapore’s GB implementation, (2) key success factors, (3) challenges of Singapore’s GB implementation. A comprehensive literature review is used to address these objectives. The results show that to support its strong green vision, Singapore has prepared a comprehensive master plan for its GB implementation and a series of regulation, standards and certification program. Key success factors identified include government policy, incentives, legislation, and strong support from related industries. Despite its current success, Singapore is still facing challenges, particularly in terms of large number of existing buildings to be certified, and high usage of natural resources and materials in construction activities. These lessons learned are very valuable to build a strategic framework for GB implementation in Indonesia.

Keywords: Green Building Implementation, Green Mark Scheme, Indonesia, Singapore.

1. INTRODUCTION

Building sector has been recognized as one of the largest contributors of greenhouse gas (GHG) emissions with up to one third of total global emission per year, particularly during the operational phase. This sector is also responsible for up to 40% of global energy consumption.¹ Considering its long life cycle, from planning, design, construction to operation and maintenance, this sector certainly has significant impact on the environment. Green building is the key answer for reducing emissions in building sector.

Green building (GB) has been defined by researchers and experts in many ways.²,³ However, they share green common components related to environmental sustainability, whole life cycle perspective, health issues and impacts on the community. It should be noted that the term of GB has been interchangeably with ‘sustainable building’ and ‘high performance building,’⁴ as well as ‘sustainable construction.’⁵

The benefits of GB are mainly related to sustainability aspects of built environment as it adopts whole life cycle views in terms of planning and development of communities.⁶ GB also can enhance the productivity and health of building users and communities. In terms of economic and financial, it also fosters economic development and yield financial return for stakeholders.

To support the implementation of GB, Indonesia has a set of national legislation in Indonesia related to GB, e.g., law no. 28/2002 on buildings, regulation of the state minister for the environment no. 08/2010 on the criteria and certification of GBs, regulation of the state minister for public works and housing no 2/2015 on GB, and regulation of the state minister for public works and housing no 5/2015 on general guide on the implementation of sustainable construction on public work infrastructure and housing.

At province level, Jakarta as the capital of Indonesia, issued regulation of governor of Jakarta no. 38/2012 on GB focuses on commercial and large-scale buildings with the scope of new planning and construction, and existing building, i.e., energy and water consumption reporting. At city level, Bandung is the first city in Indonesia that launch regulation on GB to obtain building permit (IMB). Another city, Makassar is currently preparing regulation on GB for commercial and large-scale buildings with the scope i.e., vegetation in residential homes.

GB implementation in Indonesia is still at early stage. As of July 2015 the number of green certified buildings is only 14, consisting 8 new building and 6 existing buildings.⁷ The certification...
is carried out by Green Building Council Indonesia (GBCI), a non-governmental organization (NGO) established in 2009 which is an emerging member of World Green Building Council based in Toronto, Canada. On the other hand, Singapore has successfully achieved more than 30% of the target in May 2016 with more than 2,700 buildings are Green Mark certified. It indicates that new strategy is needed to boost the progress of the GB implementation in Indonesia.

The aim of this research is to explore lessons learned from Singapore’s GB implementation success story to be adopted in Indonesia. The objectives are to identify:
1. road map of Singapore’s GB implementation,
2. key success factors,
3. challenges of Singapore’s GB implementation.

2. RESEARCH METHOD
A comprehensive literature review has been used to address the objectives of this research. Secondary data obtained includes documents related to policies and regulation available at official website. Descriptive analysis was conducted based on the concept, theory, data and information, and policies related to GB.

3. THE IMPLEMENTATION OF GREEN BUILDING (GB) IN SINGAPORE
Singapore is a small island-city state which ranks the third most densely populated country (7,697 people/km²). Having limited areas of only 719.1 km² and no natural resources, have forced Singapore to adopt principles of sustainable development for its own benefits. Singapore has set an ambitious vision to be global leader in GB. Its sustainable vision is “greening 80% of all buildings in Singapore before 2030.” To achieve this vision, three strategic goals have been established, i.e., continued leadership, proven sustainability performance, and wider collaboration and engagement. Started with only 17 Green Mark certified buildings in 2005, Singapore’s GB movement has successfully achieved more than 30% of the target in May 2016 with more than 2,700 buildings are Green Mark certified.

3.1. Key Milestones of Singapore’s Green Building (GB) Roadmap
Learning from the roadmap of Singapore in the implementation of GB over the last decade, there are important aspects behind the success of Singapore. They are related to the strong commitment from the policy maker, comprehensive masterplan, incentives, legislations, research and training. Figure 1 shows the milestone of Singapore’s GB implementation from 2005 to 2015. Each of the key aspects will be explained below.

3.2. BCA Green Mark Schemes
Endorsed by the National Environment Agency, in 2005 Building and Construction Authority (BCA) of Singapore launched Green Mark Scheme as the first initiative to promote the adoption of GB design and technologies to be more energy efficient and environmentally friendly. BCA Green Mark is also a rating system to measure the environmental impacts and performance of a building to be categorized as a GB, i.e., Platinum, Gold Plus, Gold or Certified. It provides a framework to evaluate the performance of both new and existing buildings within key areas of energy and water efficiency, environmental protection, indoor environmental quality, green features and innovation.

3.3. Masterplans and Blueprints
To achieve its ambitious green vision, Singapore unveiled its first GB masterplan in 2006 and introduced Public Sector Taking the Lead in Environmental Sustainability (PSTLES) initiative. This first GB Master Plan aimed at encouraging stakeholders to adopt new GBs. It has the following initiatives, i.e., spurring the private sector, imposing minimum standard on environmental sustainability for buildings, promoting research and development in environmental sustainability, and building up industry capability.

In 2009, the Singapore Sustainable Blueprint was launched, unveiling the second GB Masterplan. The second GB Master Plan was launched in conjunction with the target of Inter-Ministerial Committee on Sustainable Development (IMCSD) for greening at least 80 per cent of buildings in Singapore by 2030. It has initiatives (6 strategic thrusts) as follows:
1. Public sector taking the lead, all new public sector buildings must meet GM Platinum and Existing public sector buildings must meet GM Gold Plus by 2020,
2. Encouraging the private sector with Green Mark Gross Floor Area (GM GFA) Incentives Schemes, bonus for developer that earn higher-tier GM Awards for their new buildings and reconstruction project, S$100 M scheme for building owner for retrofit, co-fund up to 35% of the retrofitting cost,
3. Furthering the development of GB technology by opening BCA Zero Energy Building,
4. Building industry capabilities through training,
5. Profiling Singapore and rising awareness through green events,
6. Imposing minimum standards, focusing on the need of regulation. The Singapore Sustainable Blueprint (SSB) 2015 was later introduced in 2014 together with the third GB Masterplan. This third master plan was developed to drive energy consumption behavioral change of building occupants.

3.4. Incentives Scheme and Legislations
Incentive scheme has been introduced particularly to encourage private sectors to actively involve and support the green vision of Singapore. The S$20 million Green Mark Incentives Scheme for New Buildings (GMIS-NB) was initially introduced by BCA in 2006, followed by a S$100 million Green Mark Incentives Scheme for Existing Building (GMIS-EB) as well as Green Mark Incentives Scheme for Gross Floor Area (GM GFA) in 2009. To encourage innovation in GB development, Green Mark Incentives Scheme for Design Prototype (GMIS-DP) worth S$5 million was introduced in 2010. In 2011 BCA implemented the Pilot Building Retrofit Energy Efficiency Financing (BREEF) Scheme. Another incentive scheme was then applied in 2014 for Existing Buildings and Premises (GMIS-EPB). These incentive schemes are one of success factors of the GB implementation in Singapore and able to spur the private sectors to engage and to succeed the green vision of Singapore.

The legislations aim to regulate information, data, and reports related the Green Mark Scheme. Since 2007, BCA has formulated and implemented various legislations, e.g., legislation on Environmental Sustainability for New Buildings (2007), Environmental Sustainability Measures for existing buildings (2012), Annual Mandatory Submission of Building Information and

3.5. Research, Training and Engagements


3.6. Lessons Learned from Green Building (GB) Implementation in Singapore

Starting with a strong commitment from the policy maker to set and achieve the green vision, BCA has been endorsed and fully supported by the National Environment Agency to develop and manage the Green Mark Scheme. The public sector takes the lead and gives good examples in greening both new and existing public sector buildings. Singapore provides incentive schemes to encourage the private sectors to green their new and existing buildings, as well as building the industry capability to support green technologies. It also offers adequate government support for GB research and trainings, and continues efforts in raising ‘green’ awareness for public and industry. The combination of these factors is the key success of the GB implementation in Singapore.

Despite the success, Singapore also faces barriers of its GB implementation. They are essentially related to the high cost premium, unequal distribution of benefits, lack of green product information, complex legislation, and lack of awareness. The high cost of a GB is related to provisions of green materials and low cost of conventional ones. The lack of awareness is related to the public’s low awareness of green technologies and the benefits they can provide.

In terms of benefits, the tenants of a GB are seen to have more. The practical experience also shows that GBs can provide savings in energy costs, as well as improved indoor air quality and thermal comfort. The implementation also encourages the private sectors to green their new and existing buildings, as well as building the industry capability to support green technologies. It also offers adequate government support for GB research and trainings, and continues efforts in raising ‘green’ awareness for public and industry. The combination of these factors is the key success of the GB implementation in Singapore.
benefits compared to the builder who have to fork out the premium costs. The lack of information of green products, system and technologies put the builders in difficult position to execute a GB. As the codes and regulations of GBs are getting more complex, the builders find difficulties in estimating the costs to comply with the codes and regulation. A lack of awareness of GB issues is still found in Singapore construction industry. The use of materials which are not environmentally friendly by local contractors is still found in practice. Public awareness of the benefits of GBs is also still insufficient.

4. RECOMMENDATIONS FOR INDONESIA
The reasons behind the slow development of GB in Indonesia may be due to the absence of strong vision of the government in GB implementation. Hence, the policy makers should show strong commitment and leadership to establish green vision, comprehensive policies and set the target. The government can launch public campaign to educate and to change mindset of society and develop a new green culture of reducing energy consumption through GB.

Raising awareness and willingness of building owners and managers to implement energy efficient program for their properties can be very challenging. However, this can be successful if they can be convinced particularly with the economic benefits for them, as it can cut up to 30% of total operating costs. They will likely to invest voluntarily for this cost saving. One of the key success factors of Singapore is the incentives for the private sectors to engage with the GB implementation and to drive the private sectors voluntarily to contribute. GB implementation need involvement from the industry which provides the green materials and technology, therefore cooperation with industry is paramount.

5. CONCLUSION
This paper has presented the milestone of the GB implementation roadmap of Singapore. To achieve its ambitious green vision, it has prepared a comprehensive master plan for its GB implementation and a series of regulation, standards and Green Mark certification program.

Key success factors identified include government policy and leadership, incentives, and strong partnership with regulatory agencies, collaboration and engagement with related green industries. Despite its current success, Singapore is still facing challenges, particularly in terms of large number of existing buildings to be certified, and high usage of natural resources and materials in construction activities. These lessons learned are very valuable to build a strategic framework for GB implementation in Indonesia. Further research could be focused on developing a comprehensive framework for GB implementation in Indonesia.

References and Notes