

Comparative Study on Green Criteria in Indonesia

Rahma Purisari¹, and Ratna Safitri²

Department of Architecture, University of Pembangunan Jaya
Tangerang Selatan, Indonesia

Abstract: *Green building has become a trend in our society nowadays, particularly in Jakarta since Jakarta Provincial Government has issued regulations related to Green Building. The stakeholders of the building began to realize that the demand for green buildings has increased. With the increasing public awareness of the importance of protecting the environment and health, Indonesia continues to promote green building certification, for both existing buildings and new buildings. First green rating tool was introduced by the Green Building Council of Indonesia (GBCI) in 2010 while the first government regulation on green building was introduced in 2012 by the Jakarta Provincial Government. Then the latest regulation introduced by Ministry of Public Works and Housings in 2015.*

This paper presents a comparative study of green building criteria in Indonesia: green building criteria issued by GBCI green-ship rating, green building criteria issued by the Jakarta Provincial Government, and green building criteria issued by Ministry of Public Works and Housings. This paper compares parameters and criteria listed in those documents. This study will also map the changing process and the criteria development in order to find the lack of existing criteria and propose significant improvement in the guidelines. This study will focus on sustainability aspects so the comparative study can produce appropriate direction for the development of green building criteria with the context towards Indonesia's sustainable development.

Keywords: *green building, green criteria, sustainable development*

1. Introduction

Green building trends has been developed globally as well as in Indonesia. The regulation is confirmed in terms of green building that meets the requirements of the building which had significantly measurable performance in energy saving, water, and other resources through the application of green building in accordance with the functions and classification in every stage of its implementation. But the numbers of certified green building were not very significant, three were 18 certified green building from registered new and existing building in Indonesia by the year of 2015. Now and then, the green building trends will continue increasing. The stakeholders will certified theirs building since the emergence of awareness to improve the quality of the environment increases. Inevitably, a campaign to raise awareness and regulation is needed in socializing and raising the demand of green buildings.

However, not many regulations or government decision to oversee policy on green building until 2010 begins with Green Building Council Indonesia (GBCI) as a certification council for the category of green building in Indonesia. As a non-profit institution, GBCI has issued a green rating tool which refers to the GBC Canada but have adapted to the climate and conditions in Indonesia.

GBCI presence is not enough, we still need support regulation from the government so that everyone the same purpose in maintaining the balance of nature with green buildings all over Indonesia have the formal standard. Then, in 2012 DKI Jakarta provincial government issued a policy regarding green buildings, and the latest green building regulation issued by The Ministry of Public Works and Housings in 2015.

2. Methodology

The data collections for the study were through qualitative approaches where logical analysis was carried out. Online journals, websites and articles were gathered on related issues relevant to the study's objective and became the initial method to collect the data. The priority is to focus on the three regulations that implement the green building rating systems: Green Building Council of Indonesia (GBCI), the Jakarta's Decree, and the Ministry of Public Works and Housings. These rating systems were analysed based on their criteria in terms of similarities and differences. This paper is aimed to compare the regulations that the ministry needs to be aligned with international standards GBCI which has intensify building performance requirements in all over Indonesia. The criteria developed are mostly applicable to the current building in operation and taking into account the planning, design and construction phases for criteria development.

3. Overview

3.1. Green Building Council Indonesia (GBCI)

GBCI launched a voluntary Green-ship Rating Tool in June 2010 that could be applied in all administrative region of Indonesia. One of the main issues of the government's effort to develop infrastructure is equitable development. GBCI effort to develop green building criteria that could represent and applicable to all Indonesia's region was faced with those uneven condition of infrastructures. GBCI have to develop standard that could be implemented in a big city surrounded by infrastructure facilities and could also be implemented in small cities without infrastructure facilities. Moreover, since Green-ship is voluntary based rating tool, it should be supplementary to the state and local government regulations. The problem is most of local government depends on the state regulation. In some cases, state regulation could not cover the problems that are faced by local government, and yet do not have local regulation to control. Green-ship should determine a position between the state and local regulations in order to complete the building standards and to be feasibly implemented in all regions of Indonesia.

3.2. Jakarta's Decree on Green Building

Jakarta's Decree on green building is the first of local government regulation of green building in Indonesia. This regulation is mandatory and applies to all existing buildings or new buildings that meet certain minimum area requirement in the region of Jakarta. To develop green building criteria, Jakarta provincial government supported by the IFC (International Finance Corporation) in updating information building development in Jakarta and simulation of building performance. They also discuss with various parties involved in green building issues to obtain input for the regulation to be feasibly implemented. The Jakarta's government effort to initiate the Green Building Regulations needs to be appreciated. This regulation was made to complete the state existing regulations and adjusted to the unique requirement of Jakarta. Since it is mandatory, it should be feasibly implemented and enforced also could be revised to meet the building development in Jakarta.

3.3. Ministry of Public Works and Housings' Decree on Green Building

The Ministry of Public Works and Housings promoting Ministerial Regulation No. 02/PRT/M/2015 on Green Building to support a sustainable efficient in the use of resources and contribute to reducing greenhouse gas emissions. The necessary fulfillment of the requirements of green building in every phase of implementation to achieved the performance of buildings measurable criterias: efficient, energy saving and water, and also more healthy and comfortable buildings, and in accordance with the carrying capacity of the environment as the action of the reduction of Green House Gasses (GHG) caused by the management of the building. Since then, various sectors of public works pouring strategies and regulations needed to achieve the national action plan mitigation and adaptation to climate change. The ministerial regulation cannot bind or impose sanctions, but could be a guide to the drafting of local regulations. Therefore, the role of local government is very important in making the

rules at the same time implementing it. In the future after all cities applying this regulation, the wider community would benefit and interests of the construction of buildings that not only prioritizes technical aspects of safety, health, comfort fit that apply, but also considering the used of energy efficiency and intended to ensure the realization of sustainable development in urban area.

4. Result

4.1. Minimum GFA Requirement

GBCI determine GFA (Ground Floor Area) 2500 sqm as a minimum requirement to be assessed based on discussions with several professional expert that it believed will be multiple storey and require a certain electrical and mechanical equipment to support and require a certain treatment for the waste. Jakarta’s government regulation determined 50,000 sqm as a minimum GFA for office building to comply with. It could be understood since the regulation was new for Jakarta’s property players and indeed the building with GFA more than 50,00sqm2 will require a lot of energy to support and require a treatment for it waste. It is believed that 50,000 sqm is a result of discussion with all property stakeholders in Jakarta. Furthermore, the Ministry of Public Works and Housings determined 5,000 sqm as a minimum GFA for mandatory buildings, 500-5000 sqm for recommended buildings, and simple complexity area for voluntary building.

TABLE I: The Minimum GFA Requirement

GBCI	Jakarta’s Decree	Ministry
NB v.1.2	38/2012	02/PRT/M/2015
2500 sqm	50.000 sqm	5.000 sqm

4.2. Comparison of Main Criteria

The main criteria reflect the basic requirement that need to be concerned. According to TABLE II, it seems that all of those three regulations agreed on three main issues, which are energy, water, and indoor quality. For “Energy” main criteria, Jakarta Decree and Ministry of Public Works and Housings choose the term ‘Energy Efficiency’. Green-ship prefer to use term GBCI ‘Energy Efficiency and Conservation’, although there are not provide explanation about the difference between efficiency and conservation. Similarly with ‘Water’ main criteria, they prefer to use term ‘Water Efficiency’ and Green-ship prefer to use term “water conservation”, yet the details of the criteria are quite same.

TABLE II: The Main Building Criteria

Main Criteria	GBCI NB v.1.2	Jakarta’s Decree 38/2012	Ministry 02/PRT/M/2015
Energy	✓	✓	✓
Water	✓	✓	✓
Indoor Quality	✓	✓	✓
Other Issues:			
Site	✓	✓	✓
Material	✓		✓
Environment			✓
Construction		✓	✓
Other features			✓
Innovation			
Management	✓		✓
Waste	✓	✓	✓

TABLE III shows weighting comparison of main criteria. GBCI agreed to give a largest portion on the energy criteria which reflected from the amount of points or percentage of all criteria. Second largest weights of main criteria are different between those three regulations. Different with GBCI rating tools, Jakarta’s Decree and Ministry of Public Works and Housings are not equipped with weighting. All building in Indonesia especially in Jakarta that meet the requirement should complied to all criteria listed in the regulation or otherwise will not have a permit to operate.

TABLE III: The Weight of Main Criteria

Main Criteria	GBCI NB v.1.2	Jakarta’s Decree 38/2012	Ministry 02/PRT/M/2015
Energy	25.7%	-	-
Water	20.8%	-	-
Indoor Quality	9.9%	-	-
Other Issues:			
Site	16.8%	-	-
Material	13.9%	-	-
Environment			
Construction			
Other features			
Innovation			
Management	12.9%	-	-

4.3. Comparison of Sub Criteria

TABLE IV shows a comparison of sub criteria listed in “Energy” main criteria. There are six sub criteria that likely to be concerned among those green building criteria, which are building envelope, lighting system, electrical system, ventilation, energy efficient, and air conditioning. There is one sub criteria listed only on GBCI that is renewable energy. Both Jakarta Decree and Ministry of Public Works and Housings literally mentioned about climate change impact as part of energy criteria that request a report of CO2 emission reduction for building to be assessed.

TABLE IV: The Comparison “Energy” of Sub Criteria

Sub Criteria “Energy”	GBCI NB v.1.2	Jakarta’s Decree 38/2012	Ministry 02/PRT/M/2015
Building Envelope	OTTV calculation	Building Envelope System	Building Envelope System
Lighting System	Natural Lighting	Lighting System	Lighting System
Electrical System	Electrical Sub Metering	Electrical System	Electrical System
Ventilation	Ventilation (an efficient ventilation)	Ventilation System	Ventilation System
Renewable Energy	On site renewable energy	-	-
Energy Efficient	Energy efficiency measures	Energy efficient equipment and audit energy	Energy efficient equipment and audit energy
Air Conditioning	Air conditioning system	Air conditioning system	Air conditioning system
Building Transportation System	Vertical transportation system	Building transportation system	Building transportation system
Others	Climate change impact	-	Climate change impact

Comparison of sub criteria that listed on ‘water’ criteria is shown at TABLE V. Three of them mentioned about five sub criteria that need to be concerned, which are efficient fitting, efficient usage, water recycling, water for landscape and irrigation, and rain water harvesting.

TABLE V: The Comparison “Water” of Sub Criteria

Sub Criteria “Water”	GBCI NB v.1.2	Jakarta’s Decree 38/2012	Ministry 02/PRT/M/2015
Efficient Fitting	Water fixtures	Water efficient fitting design	Water efficient fitting design
Efficient Usage	Water usage calculation Water metering Water use reduction	Water usage design	Water usage design
Water Recycling	Water recycling	Water recycling system	Water recycling system
Irrigation and Landscaping	Water efficiency landscaping	Source of water for landscape	-
Alternative Water Resources	Rainwater harvesting Alternative water resource	Rain water harvesting	-

On indoor quality sub criteria, commonly the three rating tools have same concern on thermal, visual and noise (audial) comforts and healthy environments (TABLE VI). Jakarta’s Decree concern also on healthy environment, include air flow, CO and CO₂ monitoring, and non-hazardous refrigerant. Yet the Jakarta’s Decree and Ministry of Public Works and Housings are not literally mentioned about comforts, except thermal and humidity standard that listed in ‘energy’ criteria.

TABLE VI: The Comparison “Indoor Quality” of Sub Criteria

Sub Criteria “Indoor Quality”	GBCI NB v.1.2	Jakarta’s Decree 38/2012	Ministry 02/PRT/M/2015
Thermal	Thermal comfort	-	-
Visual	Visual Comfort Outside view	-	-
Audial	Acoustic level	-	-
Healthy Enviroment	Outdoor air introduction CO2 monitoring Environmental tobacco Smoke control Cemical pollutant	Calculating air changes flow CO2 monitoring device CO monitoring device Non CFC refrigerant Non-hazardous refrigerant	Controlling CO2 and CO Controlling the use of a refrigerant

The “other” sub criteria comparison is shown on TABLE VII. Three of them concern about site and supporting facilities, which include: concern about urban guideline or government regulation (density, urban redevelopment), concern about accessibility and connectivity (public transportation, bicycle, parking, and public facilities), and concern about greenery. Three of them also concern about green construction process which include: concern about materials (source, fabrication, module, emission, reuse, recycle, green certified), concern about construction process (earth work, green management, and construction waste), concern about workers (healthy and safety working environment), and concern about management (green professional, green contractor). The sub criteria that left differently between those three green building criteria are innovation (listed in GBCI), refrigerants and non ODS usage (listed in GBCI yet Jakarta’s Decree and Ministry of Public Works and Housings listed in ‘indoor quality’ criteria), occupant survey (listed in GBCI), building/fit-out manual (listed in GBCI), microclimate and green building submission data (listed only in GBCI). The Ministry of Public Works and Housing listed more specifically in the “others” of sub criteria, which are site suitability, object determination, site planning, building orientation, hazardous site planning, green open space, basement planning, parking area, and outdoor lighting. Furthermore, it also concerned about suitability of management and building

utilization, environmentally friendly material, supply, green conservation, green behavior, waste management, and solid waste management.

TABLE VII: The Comparison “Others” of Sub Criteria

Sub Criteria “Others”	GBCI NB v.1.2	Jakarta’s Decree 38/2012	Ministry 02/PRT/M/2015
Site Development and Transportation	Site selection		Site suitability
	Basic green area		Object determination
	Storm water management	Spatial requirements	Site planning
	Community accessibility	Supporting facility	Building Orientation
	Site landscaping		Hazardous site planning
	Public transportation		Green open space
Material, Environment Protection, Construction, Material, and Waste	Bicycle facility		Basement planning
			Parking area
			Outdoor lighting
	Pollution of construction activity	Occupational health and safety	Suitability of management and building utilization
	Environmentally friendly material	Solid and liquid waste management	Environmentally friendly material, supply, and green conservation
	Building and material rescue	Hazardous waste material management	Green behavior
	Regional material		Waste management
Certified wood		Solid waste management	
Others	Prefab material		
	Basic waste management		
	Advance waste management		
	Fundamental refrigerant		
	Non ODS usage		<i>Phase:</i> Programming
	Green professional	Water conservation	Technical Planning
	Fit out agreement		Construction
Occupant survey		Utilization	
Proper commissioning		Demolition	
Data submission			
Micro climate			

5. Suggestion

Comparisons of main criteria and sub criteria among three regulations (GBCI, Jakarta’s Decree, Ministry of Public Works and Housings) above tends to have same criteria. The main criteria are almost the same (energy, water, indoor quality, other issues) with the differences among them are technical aspect explanatory determine the weight of each main and sub criteria. The difference that very noticeable is that the Ministry of Public Works and Housings has a clear stages, which are programming, technical planning, construction, utilization, and demolition. Which has not been specified in other regulations and the demolition stages of programming, so it should also be reduced in greater detail for the technical implementation. As in ministerial regulations do not meet the completeness criteria such as in GBCI regulation. The main criteria energy need to be equipped with renewable energy, the water criteria need to be equipped with irrigation and landscaping and alternative water resources, and the indoor quality criteria still need to be equipped with the sub-criteria for thermal comfort, visual and audial.

Furthermore, the position of the green rating tools issued by GBCI has no direct impact on building permits. Buildings are certified by the GBCI will increase the pride which would be good for marketing purposes. Contrast to the Jakarta’s Decree issued by the provincial government of DKI Jakarta which directly provide a direct impact such as the issuance of building permit and the certificate of eligible functions for buildings. However, the main constraint is there is a new regulation issued by the local government or the provinces in Indonesia, so the derivative to this rule applied in other areas. Green building regulations issued by the Ministry of Public Works and Housings provides provisions for green building in general requirements and should refer

to the regulations tiered in greater detail below. It would be difficult for the development and dissemination of green building in other cities. As happened in the regulation of green building in the city which requires the fulfillment of Green Building certification in advance to get a permit and eligible functions for buildings from existing or new building.

Combining mandatory government regulation (Jakarta's Decree and Ministry of Public Works and Housings) and voluntary regulation (GBCI) are perfect strategy to promote implementation of green building in wider context because the government regulations needs to be aligned with international standards GBCI which has intensify building performance requirements in all over Indonesia.

6. Acknowledgements

We are grateful to Allah SWT for good health and well-being that were necessary to complete this research. Our deep gratitude especially for Mr. Sahid who provided and expertise that greatly assisted the research although he may not agree with all of the interpretation or conclusion of this paper. We would also like to show our gratitude to Mrs. Eka for her comments on an earlier version of the manuscript. We take this opportunity to express gratitude to Pembangunan Jaya University and all of The Department Architecture members for their support.

7. References

- [1] Green Building Index Assessment Criteria for Non Residential New Construction v.1.0, first edition, April 2009, Green Building Index SDN BHD.
- [2] Green-ship for New Construction v. 1.2, Rating and Technology Division, Green Building Council Indonesia, April 2013
- [3] Kompasiana, 24 June 2015, *Percepat Green Building di Indonesia*.
- [4] Peraturan Gubernur Provinsi DKI Jakarta Nomor 38 Tahun 2012 tentang Bangunan Hijau, 11 April 2012
- [5] Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat Nomor 02/PRT/M/2015 tentang Bangunan Gedung Hijau
- [6] S. Roaf, D. Chrichton, and F. Nicol, *Adapting Buildings and Cities for Climate Change*. 2nd ed. Burlington, UK.: Elsevier Ltd., 2009.
- [7] The Jakarta Post, 13 April 2013, *Jakarta Set to See High-Rise 'Green' Buildings*.