

SUSTAINABLE, ECOLOGIC AND GREEN ARCHITECTURE, TOWARDS INDONESIA SUSTAINABLE FUTURE

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ABSTRACT

The objectives, "Why Are We Becoming Green"? The first idea to greening the structural architecture building just recognized recently, why? Because there was a belief that the environmental enhancement efforts to combat its degraded environmental quality including "the green (building) is not our business, it is government business". It is actually everybody business. In urban area, eighty percent of our activities are inside the building; at home, office, school, factory, hotel, gym, etc, only a small amount of the time spent outside the building, on the road or inside the car. Green is at the moment, a popular term in our daily life; a lot of companies and businesses claimed that they are green, by merely applying certain features in their properties. A lot of new property development claim that their development is "green". Some Indonesian architects and engineers have been designing and applying the green principles in the design and achieve what supposed to be a green building standard. It is not merely a trend, it has to be a lifestyle change, the demand of the consumer of a "green" living environment meets the planet current conditions, climate change and degrading environmental conditions. The theoretical frame work is that it is timely and important to establish a Green Building Council. "Green" has become the short-hand term for the concept of sustainable development as applied to the building industry. Green buildings, including the appropriate site development as a sound landscape planning and design also known as high performance "buildings" in terms of i.e. materials efficient used, wise settings in the case of socio-economy-physical environment development as a whole, are intended to be environmentally responsible, economically profitable, and healthy places to live and work. If not, then all of us will be suffer caused by the negative environmental impacts. As human beings as part of the planet biological creature, we should be part and follow the natural law of the globe natural process.

Keywords: Green building, human green activities, environmental design and planning

ABSTRAK

Tujuan "mengapa kita menjadi hijau"? Pengakuan kekinian terhadap ide pertama untuk menghijaukan arsitektur ini, mengapa? Karena ada kepercayaan bahwa upaya peningkatan kualitas lingkungan untuk memerangi degradasi lingkungan termasuk "bangunan hijau bukan urusan kita, itu adalah bisnis pemerintah". Hal ini sebenarnya urusan semua orang. Di daerah perkotaan, delapan puluh persen kegiatan berada di dalam gedung; di rumah, kantor, sekolah, pabrik, hotel, pusat kebugaran, dll, hanya sejumlah kecil dari waktu yang dihabiskan di luar gedung, di jalan atau di dalam mobil. Hijau pada saat ini adalah istilah populer dalam kehidupan kita sehari-hari; banyak perusahaan dan bisnis mengklaim bahwa mereka adalah hijau, hanya dengan men-rapkan beberapa fitur tertentu dalam properti mereka. Banyak pengembangan properti baru mengklaim bahwa pembangunan mereka adalah "hijau". Beberapa arsitek dan insinyur telah merancang dan menerapkan prinsip-prinsip hijau dalam desain dan mencapai apa yang seharusnya menjadi standar 'bangunan hijau'. Hal ini tidak hanya tren, namun merupakan perubahan gaya hidup, tuntutan konsumen tentang sebuah lingkungan hidup yang "hijau" memenuhi kondisi planet saat ini, adanya perubahan iklim dan kondisi lingkungan. Kerangka kerja teoritis saat ini adalah tepat waktu dan penting untuk membentuk Dewan Arsitektur Hijau. "Hijau" telah menjadi istilah singkatan untuk konsep pembangunan berkelanjutan yang diterapkan pada industri bangunan. Bangunan hijau, termasuk pengembangan site sebagai perencanaan lansekap dan desain juga dikenal sebagai efisiensi, yaitu kinerja tinggi "bangunan" pada material yang digunakan, pengaturan pengembangan secara keseluruhan kasus sosial-ekonomi-fisik lingkungan secara bijaksana, adalah pertanggungjawaban terhadap lingkungan, tempat-tempat ekonomis yang menguntungkan, dan sehat untuk hidup dan bekerja. Jika tidak, maka kita semua akan menderita akibat dampak lingkungan yang negatif. Sebagai manusia, bagian dari makhluk planet biologis, kita harus menjadi bagian dan mengikuti proses dari hukum alam.

Kata kunci : *Arsitektur hijau, aktifitas 'hijau' manusia, perancangan dan perencanaan lingkungan*

INTRODUCTION

Today's world is plagued by numerous buildings, hastily erected with little concern about how they will affect the environments into which they are introduced. The motivating factors for their constructions are allegedly speed, economics and efficiency. However after years of accepting this misguided methodology, critics are beginning to surface recommending a better path toward the future and dispelling the myths that surround their alternatives, sustainable building and construction.

Sustainable building and construction cannot be separated from Sustainable Development, as a concept, sustainable development covers almost all aspects of life, ranging from political policy, government, business strategy to lifestyle. Not only the beginning, but also the process and the outcome. Therefore, the realization of sustainable development is complex and must implement inter-disciplinary intertwined systems.

For *Green Building Council Indonesia (GBCI)*, Sustainable Building is just not a style and spirit; rather it is a new consideration in which we think about design, building construction and how we operate buildings should always be integrated with the environmental surroundings situation and condition. With GBCI rating system "GREENSHIP", sustainable design is also our 'must' efforts by considering local heritage approaches while integrating them with new appropriate technological advances. The resources of performance based on providing a quick overall assessment of performance on most critical parameters in building and enable comprehensive organization to report on its overall environmental improvement.

Also, simultaneously with *The Green Policies* as a written statement that clearly indicates the position and values of the organization on environmental and sustainability issues, reduce the life cycle and operating cost as the prime business reason for developing green building. In fact most of local architects could not be stopped from creating the more likely "green buildings" in Indonesia since ten years ago even haven't yet any official rating system. At least public buildings per year have been designed regarding this green and sustainable issue and needless to say, as modern and as tropical it could be. The purpose of this paper is to inform the readers on the many far reaching benefits that Sustainable Design has to offer, especially towards Indonesia sustainable future.

Green Building Council Indonesia (GBCI)

GBCI is a not-for-profit organization that is committed to promote and implement green building concept and principles in Indonesia. This organization has to be supported by industries, professionals, media, government institutions, non-government and other organizations in collaboration to develop Indonesia's sustainable future. Our vision is to encourage and develop the implementation of sustainable development with green building principles and market value considerations; improving the environmental awareness by changing our way of living, using the green building principles in designing, building and operating a property. This is aligned with the World Green Building Council (WGBC) 's vision; through leadership, collaboration, the global construction industry will transform traditional building practices and fully adopt sustainability as the means by which our environments thrive, economies prosper and societies grow to ensure the future health of our planet.

The GBCI's missions are; to promote and steward the market transformation, transfers of knowledge to the public and other stakeholders, facilitating dialogue and collaboration among industries, government, communities and

other stakeholders, developing knowledge, skills and standard performance (rating tools), developing a green building community that aims to reach all stake-holders. We have started the infrastructure to develop tools for awareness campaign among all stakeholders, work together with strategic partners and developing performance based on standard for designing, constructing and operating green building. One of the efforts of the objective is by developing a rating system and building certification by Indonesia's own rating system. GBCI is also providing information and knowledge on green building through seminars, trainings, and further, supporting the industries to achieve a green standard.

Becoming a member country of WGBC, an organization has to follow a road map from WGBC that is based in Toronto, Canada. The established members of WGBC are; Australia, Argentina, Brazil, Canada, Germany, India, Japan, Mexico, New Zealand, South Africa, Taiwan, UAE, US and UK; and the followings are emerging members; Colombia, Netherlands, Italy, Poland, Romania, Spain and Vietnam. Indonesia needs to become one of the member countries represented in WGBC so that we can get update on green building knowledge and practices.

GBC's are transparent, consensus-based, not-for-profit coalition-based organizations with no private ownership, diverse and integrated representation from all sectors of the property industry, including government. GBC's are created and led by respected, visionary and capable leaders, who follow an open, democratic process allowing for equal representation and participation. GBC's embrace business as a powerful solution provider, and are working to improve frameworks that harness the ability of business to deliver. They also work closely with governmental agencies, who may also be members. Some country GBC's have regional chapters. Most GBC's have staffs, develop and host programs and a green building rating system.

GBCI has a goal to raise people's awareness to create more sustainable business in city and building development in Indonesia. We need to join World GBC's to comply with international standards, gain international recognition and synchronized with the WGBC programs. We can also use the lessons learned from other GBCs and also share our knowledge and local issue. GBCI is aiming to be the resource and knowledge center for green building movement. Besides focusing on our local/specific environmental challenges we also realize that the climate change has further affect on our lives not only in one country but it has been felt globally. This is also a reason to realign GBCI to be a part of this global movement.

Why Indonesia Needs a Green Building Council?

Indonesia is a large archipelago that stretches approximately 5,200 km from east to west and approximately 1,500 km north to south, with more than 13,700 islands big and small. Located along the equator makes Indonesia's a tropical country. The challenge in Indonesia geographical condition is the archipelago. They are connected by the sea among the islands. Indonesia is also blessed by

all year long sunshine and rain. These are unique challenges for construction industry in Indonesia. Indonesia's archipelago spread so widely, that creates many unique conditions. Green is also a local issue, it is important to look at local solution, considering the local wisdom in environmental sustainable management.

There has been a study initiated Building Research Establishment (BRE) by from the United Kingdom, they have tested a certified building using several rating tools, namely; BREEAM (Building Research Establishment Environment Assessment Method), CASBEE (Japan), LEED (US) and Green Star (Australia). The results demonstrate much higher levels of variation between systems for the same "grade", for example BREEAM 'Excellent', LEED 'Platinum' and Green Star 'Six Stars' than might have been expected. The performance of a certified building is not as good as if it was tested by the other rating system, vice versa. The conclusion of the study is that none of the rating system travel well.

However, the rating system that is going to be developed by GBCI will also refer to other existing rating tools, so we are not reinventing the wheel, we can learn and share from other GBCs around the region. The GBCs need to share best practice and setting key common minimum standards. GBCI is now starting a journey, to lead construction and building industries to more sustainable building practices.

The Development Of Green Building Council Indonesia (GBCI)



Figure 1. One of the Traditional Sustainable (Lifted) Building to Avoid from Humid and Hot Local Tropical Climate

Source: picture taken by Tondy Lubis

For its research proposal and organization from the US asked about how many buildings in Indonesia are "green?". There is no "green building" in

Indonesia if we use the LEED or any other rating system that exist in the world. However, if we looked at the Indonesia's traditional buildings in rural area as well as the constructions built by the Dutch in the colonial era, mostly all tend to be responsive to Indonesia's tropical climate (Figure 1). When the building technology was improving, we were importing all the material and designed our building with any available technology. However, most of the imported technologies are not suitable for our climate and also change our way of life. Now, we are aware of the risk to do "business as usual" constructions.

Green Building Council Indonesia (GBCI) was founded in Jakarta on 15th June 2008, with seven (7) initiators and 44 core-founding members from different backgrounds. It started as a group of individuals, mainly professionals, from various background and expertise. The Council is now concentrating on getting GBCI Strategic Plan includes a number of activities including: Awareness raising, We have conducted several awareness programs and actions, such as: Conducted several meetings, workshops and seminars within our core founding members itself to raise, align and share internal awareness towards launching the GBC Indonesia; Create contacts and building good relationship with media communication partner such as; BCI Asia (and FuturArc magazine), local green radio and television stations, magazines and news papers.

Create contacts and building good relationship with several most important interest groups/community groups in our country related to green building issues. Some of them have the potential to become strategic partners and Founding Member of GBCI, such as Government sectors: Ministry of Environment, Ministry of Public works, Local Environmental Management Agency and Local Government of DKI Jakarta, etc. Academy Sectors: Indonesian Institute of Sciences, several important National & Private Universities. Industrial sectors: Industrial association such as National Construction Services Development Institute. Professionals: Architects, Landscape Architects, Planners, ASHRAE, etc. Major corporations of related industries such as building materials, contractors, cement and paint industries, etc. Building our existence and progress information: website, brochure and leaflets.

1. Market Transformation & Education. Lately the "green" terms itself has been widely used as a "gimmick" for marketing programs in Indonesia, as a result we have realized that according to our market, green building is still perceived as new industry. To be able to respond effectively to this situation we have defined a set of our basic strategy as:

- Build effective collaboration with our potential strategic partners to educate industry and market
- Define GBCI as a knowledge organization, which means that we put education as the most important program that we have to conduct. We have identified regular education events and several special education events for internal and external purposes. We also have initiated strategic cooperation in terms of education infrastructure and human resources with The Indonesian Institute of Sciences.
- Create effective market education & communication. We are about to issue several articles and papers to selected media, magazines regar-

ding green building issues.

Create and develop Green building standard. Develop standard that aligned with international standards accepted by related government authorities, and industries. During the course of pioneering the GBCI organization, there is very minimal (if none), obstacles to establishing a stable and growing GBC in Indonesia that represents all sectors of the building industry, and works closely with our government. GBCI have approached several industries and has received a positive response. The foreseen obstacles to the establishment of GBCI are skeptical mindset towards green development among the general public, and tendency to oversimplify the process among green movement actors in Indonesia.

GBCI is developing the organization and its council to include more stake-holders to join. We are open to industries and organizations that are interested to develop the organization together with the existing core founder and forming a Founding Group of GBC Indonesia. The identifiable stakeholders are a very vast list, such as; building products, manufacturers distributors, electrical utility companies, energy service providers, water & sewer companies, building owners, asset management, major property portfolio owners, commercial property developers, investors and owners, property or facility managers, residential developers, occupiers of property including commercial, retail, education & corporate, real estate companies, professional services firm including, but not limited to: architects, landscape architects, engineers, designers, planners, lawyers, project managements, quantity surveyors, interior design, industrial design, environmental consultants, specialist consultants, storm water consultants, energy modelers, construction management, contractors, builders, building and service contractors, financial community & institution, providers of financial, insurance and legal services to the property sector including banks and accountants.

In the future GBCI should have independent chapters around the archipelago that run locally but with the same ideal of the green building movement. This is an inclusive organization, built, run and operated by its member for better life of humanity. When it comes to climate change, there is no easy solution. If we all work together, we can reduce significantly i.e. the air, water and soil pollutions, the greenhouse gas emissions. But to really make a difference, it will take more than reducing personal consumption and adopting more efficient building methods. Communities and countries need to take bigger steps, including rethinking our policies and priorities. In particular we must transition from the use of fossil fuels to non-polluting forms of energy: i.e. bio-energy (biogas), wind/water, solar, etc. Determine where, how and what could and should not be develop in such a way that could damage the basic principles to reach the sustainable environmental goals.

The most important thing about being "green" is that we are not saving the earth; nature has a way to evolve and adapt to the changes to a certain situation naturally (succession) or changed caused by human activities; also that important consideration is that damage and pollution should not exceed its carrying capacity of the earth. We human are saving ourselves in order to keep

our existence by saving the bio-genetic resources, by protecting our environment as a whole, also for the sake of our need for clean environment by being 'green'. There is a popular saying that we do not inherit the earth from our ancestor but we borrow it from our children. We have the obligations to handover a live-able planet to our next generation to come (Figure 2).



Figure 2. The Green Building Concept
Source: Burnett, 2009

RESULTS AND DISCUSSION

Green Building Indonesia: Promoting Sustainable Building Concept in the Archipelago

Green is becoming a new trend nowadays and it is at the moment a phenomenal popular term in our daily life; most of companies and businesses claimed that they are in "*green communities*", by merely applying certain feature in their properties. A lot of new property development claim that their development is "*green*". Some Indonesian architects and engineers have been designing and applying the green principles in the design and achieve what supposed to be a green building standard. It is not merely a trend, it has to be a lifestyle change, the demand of the consumers of a "*green*" living environment meets the planet current conditions, climate change and degrading the important environmental functions as to harmonize and synchronized the man made and the existing nature for a comfort and healthy place to live in.

It is then important and timely that Indonesia starting to establish a Green Building Council. "Green" has become the shorthand term for the concept of sustainable development as applied to the building industry. Green buildings, also known as high-performance buildings, are intended to be environmentally responsible, economically profitable, and healthy places to live and work. The

concept of “Green” has to be brought beyond trend, and start to become the basic principles when we start a design.

The environmental impact of the building design, construction and operation industry is significant. Buildings annually consume significant amount of energy, electricity, water and produce wastes. Development shifts of land usage away from the natural, biologically-diverse habitats to hard-space that is impervious and devoid of biodiversity. The far reaching influence of the built environment necessitates the action to reduce its negative impact, green building practices could significantly reduce or eliminate environmental negative impacts, improves existing unsustainable design, construction and operation practices. As an added benefit, green design measures reduce operating cost, enhance building marketability, increase worker productivity, and reduce potential liability from indoor air quality problems, i.e. ‘the sickness syndrome’. In other words, green design has the environmental, economic and social elements that benefit all building stakeholders, including owners, occupant and the general public.

Development performance targets for Sustainable Buildings developed by Green Building Council Indonesia (GBCI), a non-for-profit organization with a mission to support, promote and maintain the goal of market transformation, changing industry and public behavior, creating a forum and dialogue, build community and expertise in building and environmentally friendly construction. They legally authorized and cooperated with the Ministry of Environment (KLH) which do the research activities with all aspect of management of the natural resources, conduct the environmental impact assessment, environmental management and laws, conservation of coastal beaches and waters, control pollution, waste treatment technology, environmental health and many another.

For supporting the targets, recently they authorized the criteria and green building certification. The government should encourage and facilitate initiative of the stakeholders in implementing mitigation and adaptation towards the climate change phenomenon through “the environmentally friendly buildings”. The perceived barriers of this government agency is still biased in laws and regulations which are made of green building regulations to serve as guidelines in building the future, because the legislation base of less powerful in determining the domain of green building terms. Their understanding was often separated from “Green Building” in its implementation, while another one has a close relationship to answer the challenges faced.

On the other hand, in the last 30 years the Ministry of Environment (KLH) seeks to promote Sustainable City as a place of establishment of Sustainable Building, through “*Program Bangun Praja*” or Adipura together with other initiative programs such as “Langit Biru (Blue Sky), Proper, Menuju Indonesia Hijau, etc.” which aims to improve performance in environmental management, and better encourage other regions outside the capital to join apply with fixed focus in creating Sustainable City in its infancy, covering up the management of the building footing and green open space (including shade), the management of public facilities, pollution control and waste water.

The second government agency involved to determine the performance

target was The Ministry of Public Works (PW/PU) as government-related elements that always made resources, such as from The Directorate of Technical Planning and Settlement Development, Directorate General “*Cipta Karya*” and Directorate of Development and Restructuring Settlements. The Ministry of PW commits to support the issues which will build their new Directorate General of Water Resources (SDA)’s building in their complex. The 8th (eight) floor of the building is targeted to be completed by the end of 2010. This building will use the concept of Green Building energy efficient. Architecture of this building will be getting tropical-style lighting and natural ventilation very possible without the Air Conditioner. This building will also use the recycle water where there will be many pond or rain water ‘harvesting’ capacities even in the 3rd floor which created the ‘garden’ in addition to socialization, to relax but also serves to bin water (Figure 3).

In general, the interior is made from recycle materials that reflect sustainable architecture. The Minister hoped that this building can be a “*Pilot-Project*” building in terms of energy, simplicity, effectiveness and flexibility, even for people who have physical disorders such as blind people. In terms of energy saving and office-room sharing must follow the requirements of new and in accordance with the new rules.

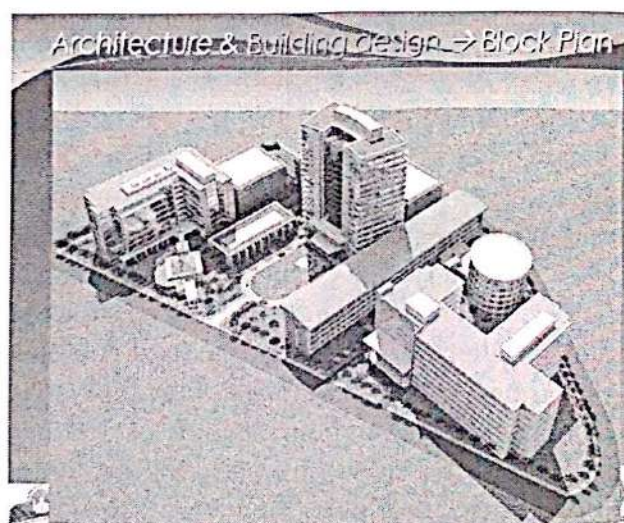


Figure 3. The Ministry of Public Works’s New Green Building Design

Source: Rana Yusuf Nasir GBCI, 2010

According to the architecture consultant stated that the modern building is based on the principles of sustainable architecture or green architecture by inserting the nature theme, incorporating natural elements such as air as possible, and by extending the natural landscape garden in the building sites. This building will broadcast 20% without air-conditioning at a given time that can be used without air-conditioning and enough air to get well, but the risk is the problem of pollution, noise and dust the way of overcoming it is to reproduce the green elements as possible, although not optimal but can be cultivated office operation. The air conditioning can be used only for 5-7 hours with

automation system. Hoping that this building can save 15-20% energy of designing a quantitative area of 20% with no air conditioning. Thus also reproduce the surface rain water reservoir, using catchment, drainage of rainwater reply was not discarded but direct-use.

Actually according to The DG of Water Resources (SDA), the Ministry of Public Works, the idea to build this 'green' building has been stated in long master plan around 2003. The new concept of green building to save electricity is a good lighting system so as not to require a lot of lights and lots of open space. The air-conditioning can be reduced and for all existing "*Building of Action* included the fire facilities could be applied for all including for people with disabilities, i.e. the blinds. The Regional Development Agencies revise the law on regulation of building construction activities from design stage through to implementation on site towards a friendly environment. Continually improving "the general plan spatial" (RUTR) and spatial details of the plan (RDTR) for the management of land use and structure for more optimal used of space. More effective policies and local initiatives to reduce disparities/administration direct to ecologically-based planning. The approach taken in planning can be administrative (an approach based on the laws and regulations) and technical (the balance between development and natural value on the development of footprint special treatment (hazard) in the damaged area with considerations of ecological, economic and aesthetic values).

Regional development of performance targets are also monitored by the Ministry of Energy Resources and Minerals (ESDM), in making regulations for the building efficiency levels that will be applied as building-database-system to create the index for some typical types of buildings according to locality, continuing disseminations to the general public and relevant agencies to promote public awareness that can enhance the level of energy efficiency awareness in industry and construction planning. Things that must have to do is the cooperation with the DG of Taxes unit in the Ministry of Finance which should be active in providing incentives and disincentives in the form of ease the procedure and the tax rate policy.

The Green Investment Status

In some cases related to the energy efficiency in Sustainable Building, simple incentives scheme can be shown from the cooperation by the tenants of building (private or public) with the landlord (the government) in sharing the cost of their building operations, i.e. installations, replacement and maintenance. The recovery of cost is really proposition even accounting for tenant turnover and depreciation, since it will make the landlord responsible for capital investment and might be could give the benchmark of energy use for the building towards reducing the use of the non-renewable resource, with the certain requirement that they must agree to the following provision governing rules.

Projections of the Indonesia's economy improved in 2010 (compared to 2009) made many business sectors activities, having the prospect of brighter conditions and are expected to grow rapidly. Besides, the dynamics of non-

sector business activities which would appear to thrive well into the future of the business activities live associated with the environmental conservation. Specifically grouped, activities related to business-friendly aspects of the environment can be divided into three main businesses: (1) the efforts of producing goods that can directly reduce carbon emissions. This product is the substitution of fossil fuels which have been widely used but lack of awareness commitment from various parties in this respect, (2) the industry which supporting environmentally friendly activities and the industry with their work-environment friendly to the environment itself, (3) both of them simultaneously function as a complement of its main businesses. It can be seen from the building materials made in Indonesia will gradually produce more friendly to the local environment.

As a supporting business in the short terms, they cannot provide significant contributions but then slowly began to contribute the majority of income, the investors who want to get more optimal benefits. This investment is a very wise choice; most of them call it the "Green Economy" in the Sustainable Building.

Policies that Promote Sustainable Building Concept

The implementation of the Green Building concept was supported by multi-aspects, regulation by the central government, the local government; consultant, owners, and other stakeholders contribute to these issues. Anyway, this is a process that everybody in different disciplines (fields) must keep their efforts to achieve. The society as an acting end user, also have a significant roles. It takes time to create the awareness among the stakeholders and users. From this concept, it is clear that one of the most important things to be considered in implementing green buildings is the availability of the policy or the regulations. *Cepe, Pamela et.al (2004)* suggests six steps to implement green building for local Indonesia's government: Inventory policies and programs that already exist, Analysis of existing and future, Discuss guidelines and existing program, Achievements stakeholders, Develop a framework of green building, and Implementation

Rationally facts, Indonesia is the view that financing policies in about the environment is essential, because pollution and natural degradation are just not environmental challenges that the economic consequences of environmental problems requires in long-term response, it is also the threatens on poverty eradication and achievement of MDGs, actions to address environmental challenges correlate to the issues of equity and justice. In the other way, Indonesia as a part of developing countries has limited options as they could not shift resources from their development agenda and poverty alleviation to the environmentally sound efforts.

The central government through The Ministry of Finance also provides the facility of import duty incentives, fiscal and tax facilities, including comforts, ease of licensing issues to improve competitiveness in order to drive investment in the country. In addition, the government through the Investment Coordinating Board (BKPM) to support all services in just one door to make it

more easily managed, including industry and construction services to support the green building practices. This effort and commitments are to reduce energy participation in preparing, providing and implementing sustainable construction. The regulations to be adjusted based on customs laws on tariffs for imported machinery, goods and raw materials in order to better provide legal certainty for taxpayers in the construction services business to meet tax obligations.

Education and Training in Sustainable Buildings

For the spirit of sustainability, we start to analyze the past to know the factors effecting settlement and sustainable building then, compared to the factors nowadays, including their building values, characteristic and interpretation of those for today. If it is already available, the system of knowledge can be developed and the know-how to be transferred through different means of training and education, create a curricula for each level of formal education and makes some model of information transfers for informal means of education for the society. The *Green Building Council Indonesia (GBCI)*, had the objectives to promote the implementation of green building principles in all building sectors in Indonesia, i.e. in designing, constructing and operating schemes and one of the efforts is by developing a rating system “*GREENSHIP*” and buildings certification by Indonesia's own rating ‘local’ system to achieve a “green standard”. On the other hand, the formal education of building techniques and architecture has a key role for keeping the traditional values as suitable to natures like lifted house (rumah panggung) constructions, sustainable material used (bamboo, hard wood construction materials, etc) which we may consider to respect.

The education is existed before the building runs regularly. Start from soil, particles, gases, and bio-contaminants investigation until entering the building. Their concentration is directly proportional to the level of human activity in the building. Also when maintaining a quality indoor environment requires special attention to these sources of pollution, which can affect the health of building occupants and maintenance workers.

Poor knowledge can lead the health problems such as Sick Building Syndrome (SBS). We can adjust on the building's heating, ventilating and air conditioning (HVAC) system. Moreover creating environmentally sound house keeping procedures, proper selection of cleaning and other chemicals used which stored in building can control the contaminants, also promote healthful surroundings and preserve building's appearance.

Besides, the management principles of education and training can be adopt for instance for administrating an environmentally building; the green house keeping and custodial practices. Finally it is also important in building's maintenance by targeted building inspection periodically, containing basement crawls space and mechanical system area, etc.

Green Building Council Indonesia (GBCI) as a part of education transformation agent have a huge effect to encourage the people including architectural,

landscape architecture and natural resource environmental management students, practitioner, government officials to change the mindset literally when seeing that the green principle is not just only being labeled or trend with sustainable or green separated-interpretation. To educate the means of a green building are not just one decked with planted boxes and sky or roof gardens. However it has brought us to a new level of awareness, giving a new design perspective when creating structures and using processes that are fully environmental responsible and resource efficient throughout a building's life cycle from sitting to design, construction, operation, maintenance, renovation and deconstruction.

Indonesia is involved as one of the countries to implement green building principles as soon as possible and will disseminate it to the government institution, private, industry, association and university. Unconsciously, Indonesia already has what the people believed as a climate responsive building, but we do not standardize it, yet. This is strengthened by the problems faced in Indonesia, like the lack of energy (especially electrical), the waste from the buildings, lack of water resource, etc. The answers of all that, is that Indonesia will explore the study on the challenge in implementing green building establishments which focuses on the evaluation. Survey to obtain current issues of the buildings is also done and some building designers are involved especially the newly built building in Indonesia.

In the industrial sector, Indonesia starts to fix the misleading between the companies and consumers on their environmental practices or their product's eco credentials. GBC Indonesia combat the Green-Washing seriously, especially on some of the material that claims to contain no dangerous contaminants like chlorofluorocarbons (CFC), halon, etc. As a matter of fact, it is no easy to fight, where the consumers are mostly ignorant concerning the practice and also the government lacks of the political will to implement regulations.

In this situation, the profession and the industry in cooperating with GBC Indonesia already contributed actively in green education through the sponsorships of green design workshops, competitions, networking, initiative and internship opportunities in architecture, landscape architecture (requirement for Botanical Garden or Arboretum design competitions) and other fields dealing with sustainability. When the market are not still doing it, then we invite the consumers had better read the fine print and do a double check before making decision to consume a kind or several kinds of materials and production in a bid to reduce the footprints.

The Adoption of Sustainable Buildings Technologies and Techniques

In the Declaration of Interdependence for Sustainable Future at Chicago, 1993, Indonesia stated that will apply the development process with all its supporting sectors, including the production of building materials that had to minimize its impact on the global environment by using efficiency methods energy resources, etc. At the implementations, we attempted to face several challenge

of Sustainable Development adoption in the application of ecological buildings, moreover create the same perception for the consciousness and collective-vision to save our environment. One side, that the cultural linkages just only for "best-buy" when consuming the product. Most of consumers will buy something with a lot of considerations. Sometimes they just follow the issue which was updated to say "green" or "sustainable" or indeed the motivation for change from the conventional practices towards environmentally practices. On the other side, Indonesia is already thinks pertaining the sustainability which is not expected that only the recently trend favored moment, not just the economic savings efforts, nor an attempt to return backwards and refused to advances in technology, more "sustainability" occurs not only with the physical manifestation of the building but rather the appreciation and understanding to maintain the natural harmony. The options exist in our hands, eventually the people's demand will need a more comfortable life that can be put in forward.

In practices, Indonesia had best solution which must be applicable not only for the newly-built buildings, but also the old building as well. The green building principles that already applied shown benefits which consist of lower operating costs, lower energy and water consumption and less (even zero) wastes. In more economical value when the construction was complete, also provide a lower insurance level, lower cost to reconfigure space, higher returns on the assets, increased property value, enhanced marketing ability, reduced liability of tenants to becoming sick, reduced risks as buildings more likely to remain competitive, green productivity, staff retention, reduced tenant turnover and absenteeism. Shortly, it improved organizational culture, morale and wellbeing. Some of the adoption of Sustainable Development techniques shown at the creating of Eco City in Indonesia, i.e.:

1. Sentul City, West Java

They order to navigate the developing and build the city more comprehensive and rapid in accordance to the today's demands and the future. Their development focus on making the green implementation that matches to local weather and regional potential to harmonize the nature. To have a conception of nature that it can minimize the negative. To have a conception of nature that it can minimize the negative side effects caused by the actual building of its physique. Cultural and heritage aspects are also serve a consideration in the development of the Sentul City beside their entertainment attraction and tourism destinations.

2. Wisma Dharmala (Intiland Tower) Jakarta

One of Paul Rudolph's building, *Wisma Dharmala* has been considered as one of the best sustainable building in Jakarta. In addition, the government cited it to be an example of how other buildings should be designed to preserve local environment. Its highly complex geometrical pieces was designed to meet more than just the esthetic merit, but also to gain a better natural air flow and lighting in order to greatly reduce the need for air conditioner and artificial lightings. Rudolph said, "Indonesian traditional architecture offers a wide variety of solution to the problem of a hot and humid climate. The unifying elements in this rich diversity are the roof (Rudolph,

2009). It is true, that the Indonesian traditional eloquently solved the problems posed by the humid hot climate (Figure 4).

Natural air flowed was coaxed through their structures by following the simple laws of hot air rising, leaving cooler air at the occupant's level, venture-like openings followed the laws of air dynamic both horizontally and vertically. The passage of air was achieved by raising structures above the ground, breezeways, venture openings in walls and roofs, controlled windows openings, manipulation of shades, shadow and light modulated in breathtaking array of roofs.

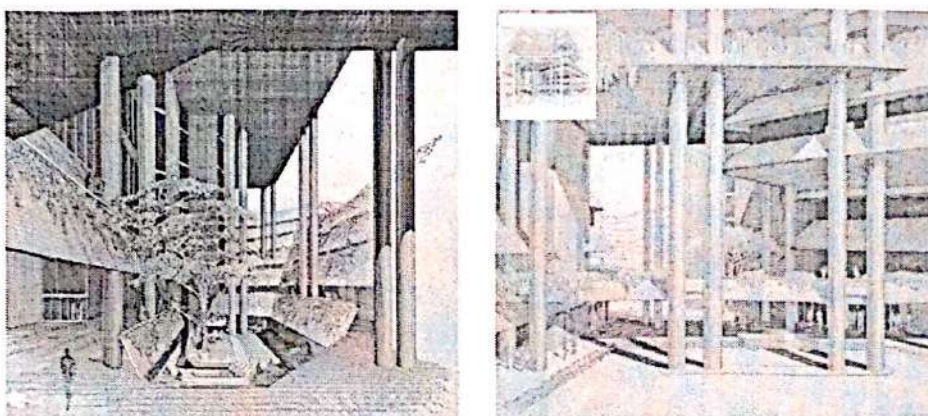


Figure 4. Wisma Dharmala Sketch Impressions

Source: Arch Net, Rudolph 2008 in Prasetyo, 2009

The unifying elements in the Indonesian's rich diversity of vernacular architecture are the roof which in Indonesian hands has produces some of the world's most beautiful buildings. The Wisma Dharmala office building takes the "roof" adapts it to a high rise, air conditioned office buildings and its supporting functions. Most importantly the building is designed to give a sense of place of being appropriate to Jakarta. It is the antithesis to the anonymous air- conditioned box constructed all around the world. Each floor of the office building has its own roof-spandrel with overhang to protect the glass from the direct rays of the sun. There are typical floors, which twist and turn as the building ascend to the top. This geometry allows the façade and the roof's to form balconies and terraces for many of the offices floors. The base of the buildings provides a covered entry under courtyard with exterior steps leading to a sunken terrace surrounded by varying kinds or restaurants.

This courtyard is essentially a breezeway shaded by the mass of office building overhead, so each floor of the courtyard steps back forming a balcony for the offices that floor. Thus the space at courtyard expands with each floor forming an inverted funnel to catch the natural daylight. Overhangs at each floor are covered with vines making the walls of the courtyard green. The office towers starts some thirty meters above the base, allowing light and air to penetrate all parts of the buildings. The building can be seen as "floating" above its base giving the whole lightness which it would not

otherwise posses. The shortcomings of this building are not successful in behavioral adaptation between the user and architect who created the design. In daily use, lots of wasted space occurred because of the typical plan form. For some space, also requires that artificially ventilation increase the burden of energy consumption in buildings. The maintenance is also difficult for the facade because the roof is too steep (Figure 5).

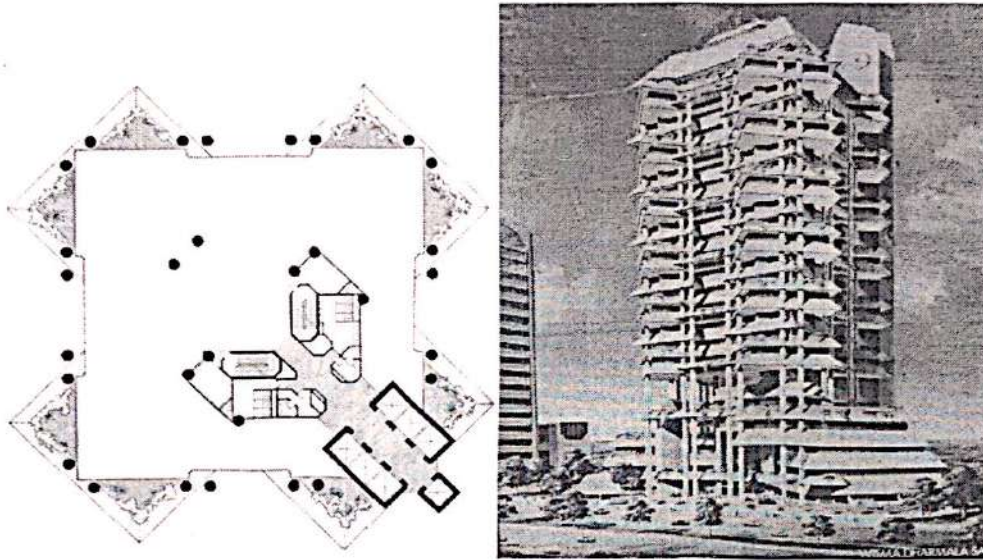


Figure 5. Wisma Dharmala Floor Plan

Source: Prasetyoadi, 2009

3. Central Library, University of Indonesia Depok

This facility was built over an area of 2.5 hectares with a total building area of about 30,000 m². The eight-floor building is targeted for completion in 2010. This library building was designed resistant to the earthquake and support the sustainable building concept. Some energy needs using renewable sources like solar energy. The library's architect is Mr. Budiman Hendropurnomo. With the green building concept is the raw material used comes from the country. For example andesitic stone or similar stone marble imported from Cianjur, West Java.

To reduce the use of electricity in the room, the wall facing the lake using double glazed to obtain natural daylight glass. Not only have that, the waste watered from the building so it can be recycled to water the plants used in the building environment. "Apart from the UI concern for the environment, the government established new rules that the building should be specialized in green building (Figure 6).

"To create a beautiful building that is easy, but making it environmentally friendly hard," said the architect. The library building when viewed from afar as the inscription in the mountains because some roof cover was designed by using green roof system that integrates with the surrounding site. regulations to direct the user's behavior to be compatible with the built environment is realized by not allowed the use of excessive plastic waste in the building, smoke-free, rich in reforestation, save electricity, paper and

water. Another thing of concern is the restrictions on Accessibility for motor vehicles near the building, but provides access for pedestrians and bicycle users to pollution levels that come into the building can be muted.

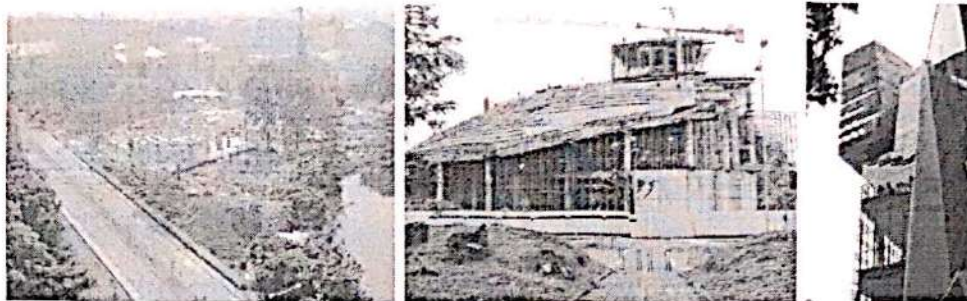


Figure 6. Central Library, University of Indonesia
Source: Denton Corker Marshall, 2009 in Prasetyoadi, 2009

4. Ecohome, ATMI IDC - Holcim Indonesia, Surakarta

PT. Holcim Indonesia Tbk. (Holcim Indonesia), in collaboration with a number of business partners and the Academy of Mechanical Engineering Industry (ATMI) Solo, inaugurated the International Building Development Center (IDC) ATMI in Solo, Central Java. The concept of eco-home, which became the basic concept of building an IDC is a new innovation, and part of the Holcim Indonesia contribution to sustainable development (sustainable development) in Indonesia, which later eco-home concept will be applied to other constructions, particularly public housing.

The two-storey building was built in six months and up beautiful in Adi Sucipto Street, Solo. Its construction also use building materials produced in house solution outlet, so it is more efficient from a variety of things: Reducing the use of woods, faster processing and lack of the use of discarded materials. As an initiative partner of Holcim Indonesia, Home Solutions (outlet) is integrated in the provision of building materials, access to financing, construction methods and design consultation. With the integrated system, the development and use of this building have been implemented.

First, the water management. At The Eco-home, some of the interlink water management features like the catchment of rainwater into the ground-water tank, proper grey and black-water treatment, purification and drink water treatment, the use of advanced water application like grease trap and relevant low rate water appliances which leads into a water efficiency up to 46%, 42% self sufficient water supply and reduction of storm water (Figure 7).

Second, it is the efficient energy management. Those begin with site understanding and optimization of passive design solution, whereby the building responds to the existing sun orientation, induces airflow and specifies finishes that absorbs less heat. Cooling in a building takes up to 70% of its total energy consumed during its operation. Insulation and air-tightness of air conditioning becomes very important key factors to reduce the energy consumption, matched with the installation of smart appliances.

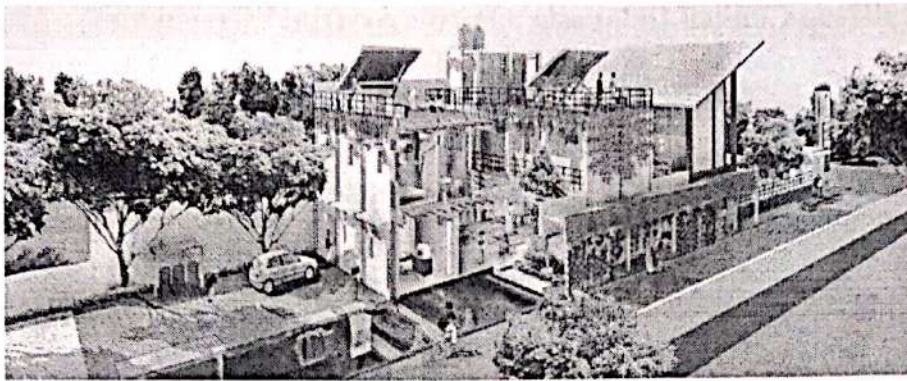


Figure 7. Ecohome ATMI IDC, Holcim Indonesia, Surakarta, 2010

Third, waste management which domestic waste is a prominent in household development. The Eco-home optimizes its domestic waste management through both changing the mindset of the occupants and also providing the system to allow easier management. The occupant needs to understand the importance of classifying waste which will be channeled to recycling industry in Surakarta. With the development of new technology, organic waste can be also recycled to reduce its environmental impact.

And the last is renewable energy sources with the implementation of integrated systems since a well performed home needs to be built with quality building resources like material that will sustain and ensure the building's durability. It is also important to select building materials that can renewable and have minimum impacts to the environment and enhance efficient installation methods. ATMI-IDC building became one of the buildings which will be a green campus in the campus environmental perspective. Holcim Indonesia partnership and building owners and business partners such as Sika, Mortar Utama, Toto, Bioseptic, Panasonic, Wavin, Broco which provide material support or completeness of the environmental perspective also makes ATMI IDC Building as environmentally friendly buildings and The ecohome that will be an example. Another economic aspect that became the hallmarks of ecohome is that all the products are locally produced (Figure 8).

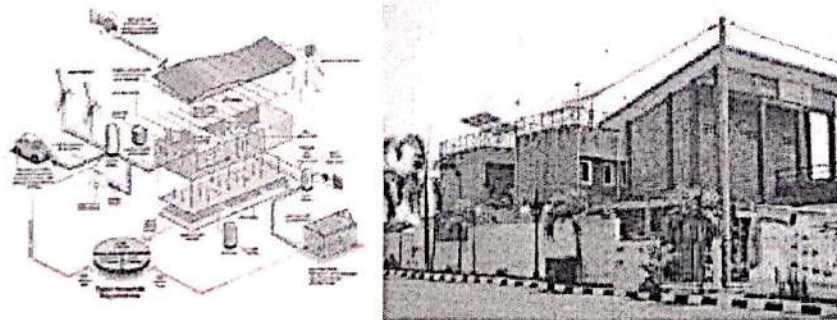


Figure 8. Ecohome ATMI IDC, Holcim Indonesia, Surakarta, 2010

Green Building Council Indonesia's Rating System: "Greenship"



Figure 9. GBCI Strategic Themes

Green Building Ratings are tools used to benchmark the environmental capability or performance of different buildings. They typically use a credit system to rate a wide range of green attributes a building might have, but will only assess attributes where the science behind the assessment is robust enough and the assessment is achievable at a realistic cost. They balance usability and accuracy, providing an extensive, but not comprehensive assessment of a building (Figure 9).

The assessment of building material is a good example of where rating tools do not yet have the capacity to make a full impact assessment and address only a selection of achievable impact areas. In time if available, we need the science and standards for *Life Cycle Assessment (LCA)* will be advanced enough so that databases will provide robust the data on the impacts of different materials over their full life cycle and designer will be able to model the total impact of a building's materials.

Since November 2009 GBCI has set up a team, led by the Director of Technology and Research, to develop its own rating system. Since the start of the development of the rating system, the team has looked into no less than 8 rating systems that are currently use around the world. The rating tools will be launched in June 2010. GBCI named its rating system *Greenship*. In February, the *Greenship Associates* training has been held to introduce the concept and draft of the rating tools for GBCI members. In the future, Green Building Council Indonesia as a not-for-profit bodies which charged with driving the transformation of markets with regard to green buildings will promote the implementation of green building principles in all building sectors in Indonesia, in designing, constructing and operating schemes, one of the effort is by developing a rating system and buildings certification by Indonesia's own rating system to achieve a green standard. They are set up under the

auspices of the World Green Building Council (WGBC) which works to set quality standards and to share knowledge around the globe (Figure 10).

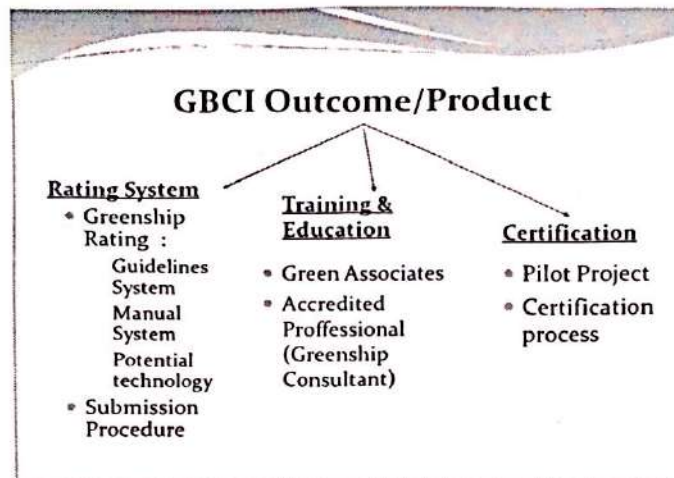


Figure 10. GBCI Outcome and Product

Figure 10 shows the process result i.e. a local Indonesia rating system, implementing dissemination through training and education and certification. As stated before, GBCI important status recently i.e. produced a “green ship” rating system and in about two years development doing dissemination to several institution 16 central as well as local governmental agencies, set three (3) Memorandum of Understandings (MoU) with The Housing/Settlement Agency (the Ministry of Public Works), Centre for Research and Development Agency, and with ASHRAE Indonesia chapter. Also visited about 6 Universities and 9 Associations, 11 Private sectors/industries, presentation in many Public Seminar & Workshops national as well as international, and monthly networks & sharing.

CONCLUSIONS

We are looking forward to have more interesting individuals as well as corporations, local governments, everybody who will join this organization for the best environmental management to come, since the GBCI outcomes are nothing if then our sustainable, ecological and green architecture will not meet: “Our Common Target for the Indonesia Sustainable Future for the Humankind, May Allah Bless Us All, Amen”

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