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Research On Standard Components In Architecture For Flat And Landed House Associated With The Concept Of Eco House And Green Building

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Abstract

Needed a solution based on planning and ecological (sustainable) to solve the common problems of development and housing settlements in Indonesia. Sustainable building is where in the planning, development, operation and maintenance in the aspect - the aspect of protecting, saving, reducing the use of natural resources, maintaining a good quality buildings and the quality of indoor air quality, and attention to the health of the occupants of which are based principles of sustainable development.

A building can be called already implementing green building concept if managed through an evaluation process to gain recognition as a green building. In the evaluation benchmark assessments used are appropriate to the local conditions and the situation in Indonesia and establishing techniques that is implemented in Indonesia. Some of the principles used to base the preparation of the benchmark are: Simple (simplicity), and can be easy to implement (applicable), available technology (available technology), and using the assessment criteria based on local standards wherever possible.

Keywords : *Sustainable, simplicity, applicable, available technology*

1. Introduction

Standard components in architecture of the landed house and flats, can be defined as a minimum requirement in the establishment of reference concerning building architectural aspects of the building, use of materials, user physiological and environmental sustainability. While the purpose of the creation of standard architectural components of the landed house flats and houses can be formulated:

- As a reference in all phases of the development process, either by the government, private entities and individuals.
- Provide security, comfort, health and the environment associated with the construction is done.
- Achieve efficiency in the process of development, so that the costs are strictly controlled, optimum quality can be obtained.

Today there are so many standard architectural components of the building are made by experts in the architecture of all parts of the world. The construction standards may vary in each region in which the standard is being developed, to accommodate the interests and circumstances specific to each region. In addition, the architecture of standard components are independent of the main goals of these standards in the pipeline, as a minimum requirement to protect the health aspects such as the user, building resilience, safety against fire hazards, earthquakes, floods and environmental aspects of sustainability. Therefore, the purpose of making the formulation of standard components becomes very crucial.

In examining these factors is expected that standardization can bridge the world of manufacturing with the architectural design world. A product has on standard criteria set by a body designated by the authorized institutions in the field of construction and building and home environment. Standardization is expected also a blend of the world's civil engineering with architectural techniques combined with the world of manufacturing and quality materials that are eco housing and green building.

Planning and construction of residential flats good to be able to translate the understanding of eco housing and green building in each component of the architecture.

Some of the components that can be used as standards set out in the plan that is like the lay out of the building, use of materials and building materials and fabrication, parts of the building such as the roof, doors / windows, floor coverings, walls, and others.

2. Methods

Analysis of a standard preparation of architectural components is done by compiling from source standard norms generally accepted architectural components used in building applications, scope of academics and basic technical standard reference architecture components.

Basic norms and standards of reference, namely the technical components of the architecture:

- Architecture Data - Ernst Neufert; Issue Airlangga, Jakarta
- Permen.PU 29 / PRT / M / 2006 on Guidelines for Building Requirements
- Kimpraswil Decree No. 403 / Kpts / M / 2002 of the Simple Healthy House

3. Results

3.1. Eco Housing Concept & Green Building Concept For Flats Housing

The concept of green building is a building which in the planning, construction, operation and maintenance in the aspect - the aspect of protecting, saving, reducing the use of natural resources, maintain the good quality of the building and the quality of indoor air quality, and attention to the health of its inhabitants who all based on the principles of sustainable development.

A building can be called already implementing green building concept when managed through an evaluation process to obtain green building certification. In the evaluation benchmark assessment system used is Rating System.

For example:

- Green building material utilizing the principle of "life cycle" (reuse), "recycling" (recycle) and is made from renewable materials (renewable resources);
- Create an environment in buildings with minimal pollutants (reducing materials that produce emissions) and,
- Landscape reducing water use (using local herbs).

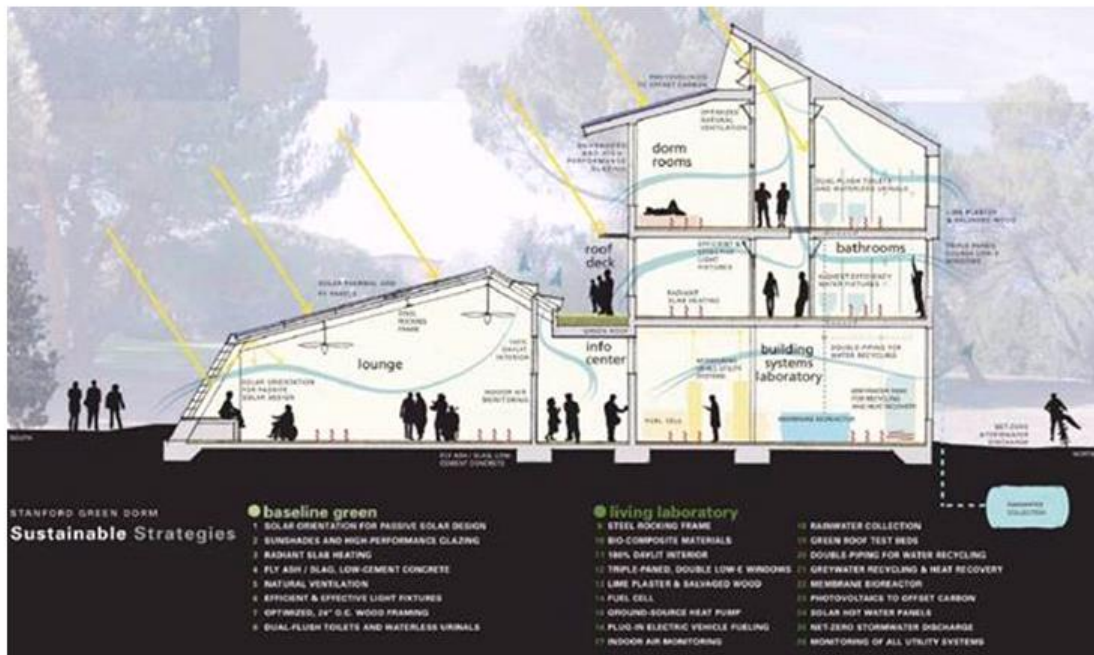


Figure 1. Conceptual drawing of the Green Dorm adapted from the project's Feasibility Study (available from: http://www.stanford.edu/group/greendorm/greendorm/feasibility_study.html)

3.2. Eco Housing & Green Building Concept For Landed House

Eco housing is environmentally friendly home which is energy efficiency with regarding to the environmental always exist in an area where the house was built. The concept of eco-housing or often called the green house has several main objectives, among others, to reduce excessive energy usage in an effort to reduce the environmental issues such as global warming while growing, protecting occupant health, reduce environmental damage and fairly economical than building to be used as occupancy.

By applying the concept of eco-housing in residential buildings or residential areas we will be able to save the use of electrical energy, and comfort that is obtained will be better. In addition, the concept of eco housing the arrangement of an area will be neat, beautiful and beautiful.

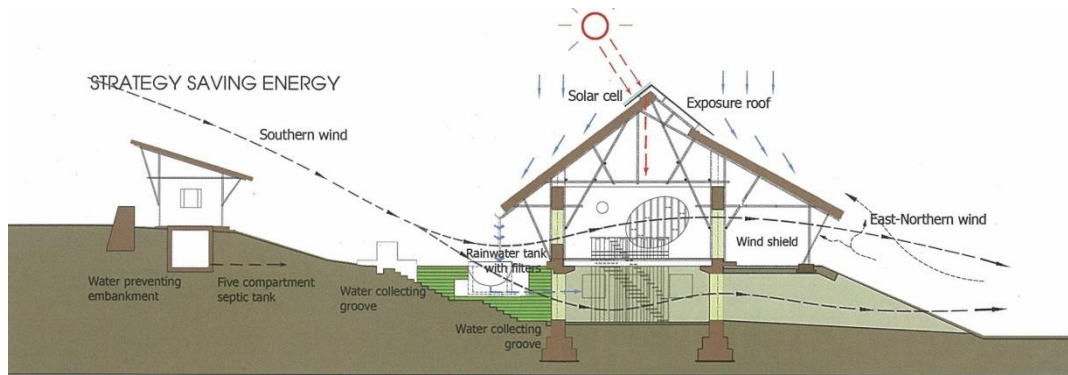


Figure 2. Conceptual drawing of the Green House adapted from the Green House Project (available from: FutureArc Magazine Green Issue 2012)

Along with increasingly concerned for the many environmental issues today will make us need to ponder a bit back on the fact that our ancestors (as the east) has long been thought of what was mentioned (west) as Ecohousing. Ecohousing, is essentially a residential home that adhered to the principle that a house will apply the Plan-considerations-Tech Materials 'environmentally friendly'.

A little look at how diverse archipelago that kara has such a long tradition applying the basic principles of the ecohousing.

- PLANNING** : Java community has recognized the principle of architectural planning and Kawruh Griya Kawruh Kalang governing the orientation of the building footprint (Site Orientation) to the construction and application. Madurese people familiar with the philosophy or 'mojur are' that set the direction of the building to synergize with the direct path of the sun so it will physically obtain optimal natural lighting and accent on comfort inhabit tropical environment. In the aspect of Building Configuration, environmental architecture 'Taneyan naked' (Madura) or 'Natar' (Sasak, Nusa Tenggara), explains the importance of local knowledge structuring and formation of functional building mass. Both start from the facade plan, pendenahan and system utilities.
- MATERIAL** : Building custom archipelago utilizing direct relative of the natural availability. But of course the exploitation of these natural ingredients have gone through the process of philosophical reflection. One thing in simple way of thinking, each timber will be used, must be selected from the tree really old. In addition due to the nature and strength needed constructively, it is the application of 'selective logging' in order to maintain the ecological functions of the forest. Even the customary, enforced in some areas (tribal) that every tree cut down the number of required planting new trees as part of an effort sustainabilitas the tree vegetation. Selection of environmentally friendly natural material is clearly above the material biodegradable organic. Safe for human use and do not pollute the environment, eg the process of finishing the coloring of the building which so far has not used synthetic materials.

- **TECHNOLOGY** : Many things related to this aspect. Wood construction techniques that use systems pegs in each gusset construction gives reliability 'swinging portal' which is adaptable to the earthquake. The building houses on stilts (eg: Tower House or Tongkonan) though may have been intended as a security initiative for habitation, but obviously with this pattern will give room for a plot of land as a leach field. It is actually very important for soil water availability for humans.

Air circulation at Joglo House (Javanese) is designed to adapt to the surrounding environment. Joglo, which usually has the form of a terraced roof, getting to the middle, the distance between the floor with the higher roof is designed not without purpose, but each of the height of the roof into a relationship stages in human movement toward joglo with air that felt by the man himself. When humans are at the very edge joglo, as the boundary between outer space with space inside, humans still sense the air from outside, but when people move more to the middle, the air felt cool, this is due to the volume of space under the roof, the to the middle of the greater.

As the existing theory on the physics building, the volume effect is actually utilizing the principle that the greater the volume of air will be hot for longer when compared with a small volume of air. When the man returned wants out, the air was again changed, from the air feels cool to the air outdoors. It can be seen that penghawaan on joglo, pay attention to the human body adjustments on the weather around it. It is a simple thing that turns out will save electrical energy.

3.3. Example of Standard Component Architecture Concept For Flats and Landed Houses Associated The Eco Housing and Applying Principles of Green Building

There are various principles of the application of the principles of eco housing and Green Building around the world. Obtained from the various examples used in the definition of the concept of applying the principles of eco housing is that eco-building minimizes resource use (in construction and life cycle) while also providing a comfortable environment in which to live.

There are many simple concepts to apply the principles of eco housing eco-housing common, as follows:

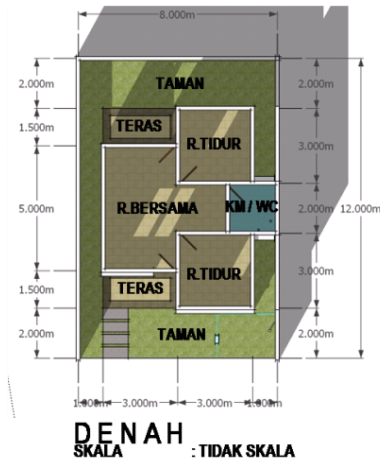
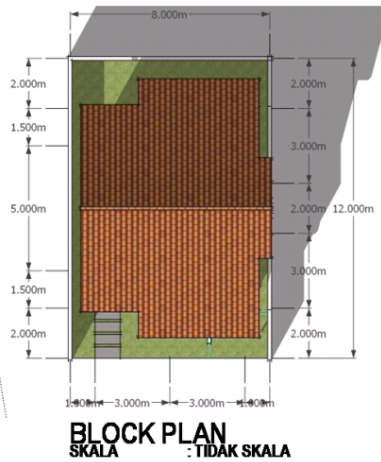
- Reduce the size (Reducing the size)
- Simple in design and to avoid unnecessary use of technology (Simple design and avoiding the use of unnecessary technology)
- Designing affordability in awalperencanaan / early stage (Designing affordability in at the start)
- Designing a modular unit so that the building can be extended at a later stage (Designing in modular units so that a building can be extended at a later stage)

- Plan for the design of the open space to allow for maximum flexibility (Internal open plan design to enable maximum flexibility)
- Using the space between buildings (Using the space between buildings)
- Building Systems is a collective (Building Collectively)
- Share of public facilities and infrastructure (sharing common facilities and infrastructure)
- Be careful and meticulous in the choice of materials (Careful choice of materials)
- Using pre-fabricated elements or structures that exist (Using pre-fabricated elements or existing structures)



Figure 3. The Pettaway Pocket Neighborhood features nine homes that share a community lawn and playground, community gardens, and a low-impact development stormwater management system.

Based on the literature, the standard component architecture for the landed house can be seen in the following table.



DEV. INDEX

LUAS TAPAK	: 96m ²
LUAS BGN	: 39m ²
JMLH R. TIDUR	: 2 Kamar
JMLH R. BERSAMA	: 1 Unit
JMLH KMR MANDI	: 1 Kamar
TERAS	: 2 Unit

Note :
 Bangunan merupakan ilustrasi / sketsa konsep desain yang berdasar pada luasan Standard Minimal dalam buku :
 Ernst and Peter Neufert
 Architect's Data



Desain / Layout :

Doddy Friesty A. ST., MT.
 Architect | Urban Designer

Figure 4. The example of landed house (source Doddy Friesty A. ST., MT. Architect 2014)

1. LAYOUT dan PERENCANAAN MATRA RUANG BGN

NOTE :
 **CHECKLIST TABEL**

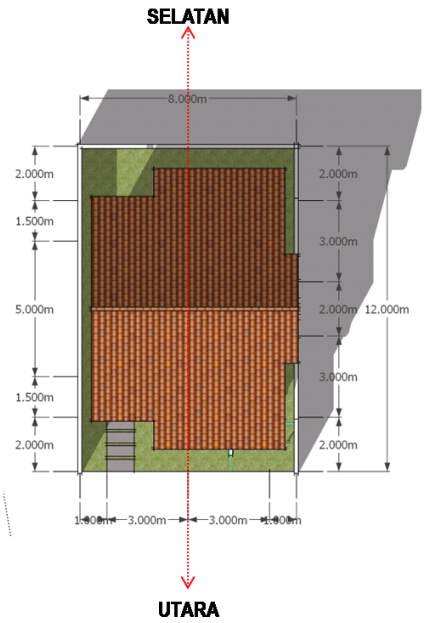
ILUSTRASI	JENIS KOMPONEN	PRINSIP PENERAPAN ECO HOUSE – GREEN BUILDING						KETERANGAN
		EFISIEN SI LISTRIK	EFISIEN SI AIR	PENERAPAN TEKNOLOGI	PENGELOLAAN BGN & LINGK.	LOKALITAS	KENYAMANAN, KESEHATAN	
	<ol style="list-style-type: none"> Orientasi thd sinar matahari (bangunan <i>RUPAK</i> diharapkan berorientasi Utara-Selatan) Ruang Terbuka Hijau min. 20% Sirkulasi silang udara (penghawaan alami – <i>cross ventilation</i>) dan bukaan di <i>RUPAK</i> Zonasi publik-privat pada bangunan. 							<p>Penentuan orientasi thd sinar matahari langsung, bangunan menghadap Utara-Selatan diharapkan ruangan tidak terpapar langsung sinar matahari</p>

Figure 5. The example of checklist table used to identify the standard component being used in landed house (source Doddy Friesty A. ST., MT. Architect 2014)

Standard components of the architecture for the application of flats and houses in the preparation footprint also refers to the application of the principle indicators of eco housing and green building.

Based on the literature that has been collected, the application of the principle indicators of housing and green eco building adapted from sources collected from;

- Ministry of Environment Regulation No. 8/2010 on Green Building
- Green Building Council (GBC) Indonesia; on Green Building Provisions
- Provisions Eco Housing and Green Building from existing experience (various sources)

Based on the literature of the application of the principle indicators of housing and green eco building diatas that has been collected and analyzed bagi indikator application of the principles of eco housing and green building dalam its application to architectural components for flats and houses can be summed up some scope tread base indicator.

Conclusion The application of the principle indicators of housing and green eco building application on component architecture for the sole houses;

- Electrical Energy Efficiency
- Efficiency
- Application of Technology
- Locality
- Materials
- Leisure & Health Occupants

10. SISTEM PENGHAWAAN / PENGUDARAAN

NOTE :
 **CHECKLIST TABEL**

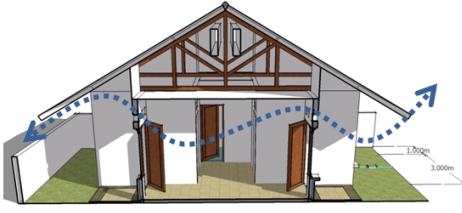
ILUSTRASI	JENIS KOMPONEN	PRINSIP PENERAPAN ECO HOUSE – GREEN BUILDING						KETERANGAN
		EFISIEN SI LISTRIK	EFISIEN SI AIR	PENERAPAN TEKNOLOGI	PENGEL. OLAHAN BGN & LINGK.	LOKALITAS	KENYAMANAN, KESEHATAN	
	Alami : Buka lebar dengan dimensi yang sudah menjadi standar dalam bangunan rumah, dan ventilasi tambahan pada bagian atas jendela dengan dimensi maksimal sehingga udara mampu masuk dan bertukar di dalam bangunan							Sistem penghawaan alami dan buatan yang disintegrasikan, dengan membuat bukaan yang standard dalam bangunan sehingga mampu memberikan aliran udara yang baik dalam bangunan tanpa menggunakan AC
	Buatan : Menggunakan AC hemat energi (ex. LG Inverter) Harga : Rp. 2.500.000 / Unit							

Figure 6. The example of checklist table used to identify the standard component being used in landed house context (source Doddy Friesty A. ST., MT. Architect 2014)

The concept of eco-housing and green building concepts can be said that the building has a system (planning-development-management) that is responsive to the environment and pay attention to the comfort and health of the occupants. Analysis of the standard component architecture for the tread which apply the principle of housing & Eco Green building can be seen in the following table.

2. LANTAI

NOTE :
 CHECKLIST TABEL

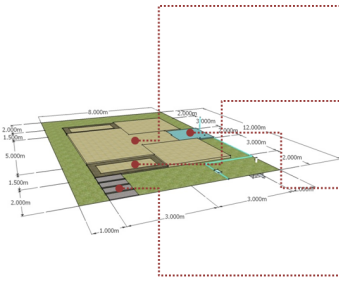
ILUSTRASI	JENIS KOMPONEN	PRINSIP PENERAPAN ECO HOUSE – GREEN BUILDING						KETERANGAN
		EFISIENSI LISTRIK	EFISIENSI AIR	PENERAPAN TEKNOLOGI	PENCEGAHAN BUNYI & LINGKAR	LOKALITAS	KENYAMANAN, KESEHATAN	
	1. Ruang utama dlm bangunan RUPAK Keramik (ex. IKAD) 30cm X 30cm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Jenis penutup lantai keramik (ex. Merk IKAD) merupakan jenis keramik yang sangat mudah didapat / aspek lokalitas. Ukuran yang telah disesuaikan dengan luasan RUPAK merupakan salah satu poin dalam efisiensi energi listrik karena tidak banyak menggunakan pemotong keramik
	2. Teras Keramik exterior (Tekstur kasar) 30cm X 30cm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	3. Kamar mandi / WC Keramik (ex. IKAD) 20cm X 20cm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	4. Perkerasan jalan selapak Rabat cor beton camp. 1:3:5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Figure 7. The example of checklist table used to identify the standard component being used in landed house context (source Doddy Friesty A. ST., MT. Architect 2014)

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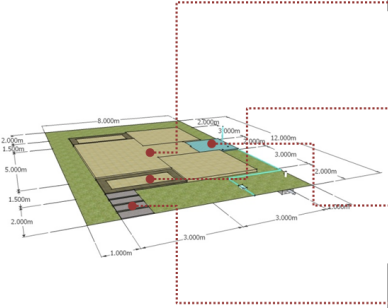
























ILUSTRASI	JENIS KOMPONEN	PRINSIP PENERAPAN ECO HOUSE – GREEN BUILDING						KETERANGAN
		EFISIEN SI LISTRİK	EFISIEN SI AIR	PENERAPAN TEKNOLOGI	PENGELOMPOKAN & LINGKUNGAN	LOKALITAS	KENYAMANAN, KESEHATAN	
	1. Ruang utama dlm bangunan RUPAK Keramik (ex. IKAD) 30cm X 30cm							Jenis penutup lantai keramik (ex. Merk IKAD) merupakan jenis keramik yang sangat mudah didapat / aspek lokalitas. Ukuran yang telah disesuaikan dengan luasan RUPAK merupakan salah satu poin dalam efisiensi energi listrik karena tidak banyak menggunakan pemotong keramik
	2. Teras Keramik exterior (Tekstur kasar) 30cm X 30cm							
	3. Kamar mandi / WC Keramik (ex. IKAD) 20cm X 20cm							
	4. Perkerasan jalan setapak Rabat cor beton camp. 1:3:5							

Figure 8. The example of checklist table used to identify the standard component being used in landed house context (source Doddy Friesty A. ST., MT. Architect 2014)

ATAP / PENUTUP BANGUNAN
 LANJUTAN

NOTE :
 **CHECKLIST TABEL**

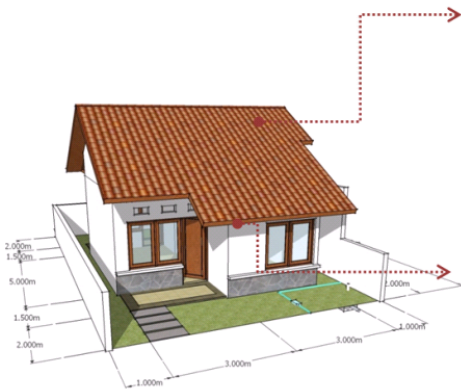












ILUSTRASI	JENIS KOMPONEN	PRINSIP PENERAPAN ECO HOUSE – GREEN BUILDING						KETERANGAN	
		EFISIEN SI LISTRIK	EFISIEN SI AIR	PENERAPAN TEKNOLOGI	PENGELOLAAN BGN & LINGK.	LOKALITAS	KENYAMANAN, KESEHATAN		
	Penutup atap : Genteng keramik (ex. KIA). Harga : Rp. 4000 / buah								
	Genteng tanah liat Harga : Rp. 1500 / buah								
	Papan lisplank Harga : Rp. 150.000 / lembar								

Figure 9. The example of checklist table used to identify the standard component being used in landed house context (source Doddy Friesty A. ST., MT. Architect 2014)

4. Concluding remarks

Today there are so many standard architectural components of the building are made by experts in the architecture of all parts of the world. Those standards vary in each region in which the standard is being developed, to accommodate the interests and circumstances specific to each region. In addition, the architecture of standard components are independent of the main goals of these standards in the pipeline, as a minimum requirement to protect the health aspects such as the user, building resilience, safety against fire hazards, earthquakes, floods and environmental aspects of sustainability. Therefore, the creation of standard components becomes very crucial.

Standardization is expected to bridge the world of manufacturing with the architectural design world. A product has on standard criteria set by a body designated by the authorized agency.

Some of the components that can be used as standards set forth in the plan such as the lay-out of buildings, use of materials and building materials and fabrication, parts of the building such as the roof, doors / windows, floor coverings, walls, and others.

Standardization is expected also a blend of the world's civil engineering with architecture engineering combined with quality materials and manufacturing world. In the conditions of the construction and development of flats and houses that are currently

important footprint for harmony and synergy with the environment and sustainable development of the standardization of these components need to also apply the principles of eco housing and green building.

Eco housing is environmentally sound home that is energy efficient with regard to the potential environmental always exist in an area where the house was built. The concept of eco-housing or often called the green house has several main objectives, among others, to reduce excessive energy usage in an effort to reduce the environmental issues such as global warming while growing, protecting occupant health, reduce environmental damage and economic calculated from start of development to be used as residential. While Green building is an attempt to produce a building using processes that are environmentally friendly, efficient use of resources during the building's life cycle from planning, construction, operation, maintenance, renovation and even to demolition.

From the analysis and study, which has been presented, it can be concluded that in general the application of the principle of Eco Housing & Green Building design in the urban environment is as follows:

- Application of Green Building Eco Housing & Urban was constantly campaigned with different ways, either in the form of houses or flats tread, in order to maximize the performance of the building by applying the concept of Eco Housing & Green Building.
- Cooperation Public-Private Government-established synergistic expected to get the order of the built environment in harmony with nature.
- Sustainability of eco-friendly home should come with environmentally friendly behavior by occupants.
- Passive design factor is significant in planning environmentally friendly affordable homes.

12.

ECO-HOUSE CONCEPT
DARI DESAIN TERKAIT

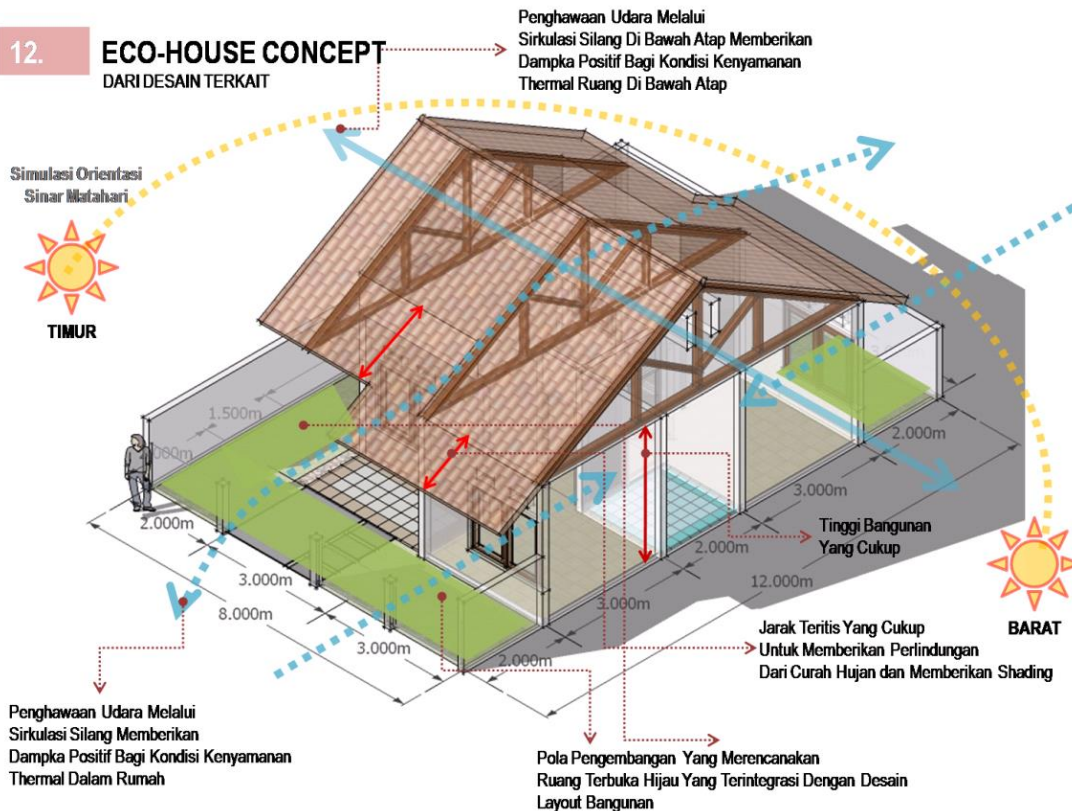


Figure 10. The example of application of green building concept with apply the standard component being used in landed house context (source Doddy Friesty A. ST., MT. Architect 2014)

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