TRANSFORMING MALAYSIAN BUILDINGS GREEN THROUGH GBI & WAY FORWARD

INTERNATIONAL URBAN SUSTAINABILITY & GREEN BUILDING CONFERENCE 4-5TH MARCH 2016. KUALA LUMPUR CONVENTION CENTRE

Ar. Chan Seong Aun
Chair Green Building Index Accreditation Panel
Immediate Past President PAM – Malaysian Inst of Architects

4th March 2016
BENCHMARKING THE FUTURE
FROM THE PAST 2009-2015
MALAYSIA’S PLEDGE TOWARDS GLOBAL GHG EMISSION REDUCTION

“...Malaysia is adopting an indicator of a voluntary reduction of up to 40 per cent in terms of emissions intensity of GDP (gross domestic product) by the year 2020 compared to 2005 levels...”

YAB Dato’ Sri Mohd Najib Tun Abdul Razak
Prime Minister of Malaysia

15th Conference of Parties (COP-15)
17 December 2009
Indoor Environment Quality
Energy Efficiency
Sustainable Site Planning & Management
Material & Resources
Water Efficiency
Innovation
YAB DATO’ SRI MOHD NAJIB
BIN TUN HAJI ABDUL RAZAK
PRIME MINISTER OF MALAYSIA

I wish to congratulate Pertubuhan Akitek Malaysia (PAM) and the Association of Consulting Engineers Malaysia (ACEM) for the launch of the new Green Building Index (GBI) tool to help property owners to upgrade their existing buildings to become more “Green” and sustainable.

This is an important step to address the threat of losses and unsustainable developments that continue to harm the environment and inefficient buildings.

The Government is committed to provide incentives in the form of tax and other financial exemptions for those who can demonstrate their commitment to more Green Buildings.

In addition, GBI Malaysia is a good example of how the private sector, professionals and NGOs can work together to come up with an internationally accepted standard for Green Buildings in the tropics. We appreciate and encourage more of such innovation and creative input.

I support and wish you every success in its implementation.

“1 MALAYSIA” People First. Performance Now.

YAB DATO’ SRI MOHD NAJIB

“1 MALAYSIA” People First. Performance Now.

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I wish to congratulate Pertubuhan Akitek Malaysia (PAM) and the Association of Consulting Engineers Malaysia (ACEM) for the launch of the new Green Building Index (GBI) tool to help property owners to upgrade their existing buildings to become more “Green” and sustainable.

This is an important step as we press towards a High Income Economy. To achieve this vision we have to plug the leaks to reduce unwanted losses and unplanned wastages. We cannot afford to have buildings that continue to use too much resources and energy whilst at the same time contribute wastage and harmful green house gases that damages the environment. The GBI tool can also help to transform all aging and inefficient buildings to become higher value assets.

The Government’s commitment to a greener future is clear. Incentives in the form of tax exemption for building owners, and stamp duty exemptions for buyers of properties that achieve GBI certification has been provided in Budget 2010. These are to help the country to build more Green buildings and also to develop more Green Technologies.

In addition, GBI Malaysia is a good example of how the private sector, professional and NGOs can work together to come up with an internationally accepted standard for Green Buildings in the tropics. We appreciate and encourage more of such innovation and creative input.

I support and wish you every success in its implementation.

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YAB DATO’ SRI MOHD NAJIB
PRIME MINISTER OF MALAYSIA

Congratulations to Pertubuhan Akitek Malaysia and Association of Consulting Engineers Malaysia for the launch of the new GBI Existing Building Rating Tool.

As the majority of existing buildings in Malaysia were built without green considerations, it is timely that GBI has developed a tool to help property owners to upgrade and retro-fit their buildings. This will give new life to aging and out-dated buildings. They will become more energy, water and resource efficient, have better indoor working qualities and also contribute less waste and green house gases.

The Ministry of Energy, Green Technology and Water is fully supportive of all such contributions and inputs to help drive the development of Green Technology in Malaysia. I am pleased to note that GBI has received the full support of Malaysia’s building and property players. Incentives for GBI in the 2010 Budget will further propel the development of more green buildings in Malaysia.

In a short time, GBI has become recognised by the world community as Malaysia’s very own green rating tool. It gives building owners who are environment-conscious, as well as business-savvy, the opportunity to build or retro-fit buildings that are not only environmentally more friendly but also make economic sense.

Well done PAM, ACEM and GBI.

YB DATO’ SRI PETER CHIN FAH KUI
MINISTER OF ENERGY, GREEN TECHNOLOGY AND WATER MALAYSIA

YAB DATO’ SRI MOHD NAJIB

GBI CERTIFIED PROJECTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Nombre</th>
<th>Pembina</th>
<th>Proyek</th>
<th>Warna</th>
<th>Status</th>
<th>Aktiviti</th>
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<tr>
<td>01</td>
<td>PTM GSO BUILDING</td>
<td>RIFAT TENGAH MALAYSIA</td>
<td>CERTIFIED</td>
<td>NRMC</td>
<td>NMC</td>
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<td>KUALA LUMPUR CORPORATION</td>
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<td>NRMC</td>
<td>NMC</td>
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<td>03</td>
<td>1 ST AVENUE</td>
<td>BANDAR TAMAN CITY SUB END</td>
<td>GOOD</td>
<td>NRMC</td>
<td>NMC</td>
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</tr>
<tr>
<td>04</td>
<td>SENTARU RESIDENCE</td>
<td>SENTARU RESIDENCE</td>
<td>CERTIFIED</td>
<td>NRMC</td>
<td>NMC</td>
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<tr>
<td>05</td>
<td>3 HAMAI</td>
<td>SUNWAY SP HOMES SUB END</td>
<td>CERTIFIED</td>
<td>NRMC</td>
<td>BHC</td>
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<tr>
<td>06</td>
<td>D1 VILLA</td>
<td>D1 VILLA</td>
<td>CERTIFIED</td>
<td>NRMC</td>
<td>BHC</td>
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<tr>
<td>07</td>
<td>KFS BAHAR</td>
<td>KFS PROPERTY SUB END</td>
<td>GOOD</td>
<td>NRMC</td>
<td>BHC</td>
<td></td>
</tr>
</tbody>
</table>

www.greenbuildingindex.org | info@greenbuildingindex.org
GREENBUILDINGINDEX SDN BHD (105547-V) R & J LIM TMTG HUB 1101, 11TH FLOOR, TRX1, 9 JALAN TRX, 50451, JANUARY, MALAYSIA Tel: 03 2264 4182 Fax: 03 2267 4182
First and foremost, I take great pride in congratulating the professional architects and engineers of Green Building Index (GBI) for the launch of the Green Building Index Township Tool and Residential New Construction Tool Version II on 29 March 2011.

The Green Building Index, first launched on 21 May 2009, was created to provide a common and verifiable building index methodology to benchmark buildings within the Malaysian context. As a follow-up, the introduction of this GBI Township Tool is significant and timely in order to widen the green transformation to the next level in line with the Government’s New Economic Model to become a high-income nation and low-carbon economy that is both inclusive and sustainable by 2020.

The Green Building Index Township Tool, as an enabling tool, will set in place the initial planning stage the objective to create sustainable Townships.

For the long term viability of our society, we must look beyond the construction of green buildings alone. The three pillars of the green building index – environmental, social and economic – must be addressed holistically. With this Township Tool, it will provide an opportunity for the application of public-private smart partnership approach throughout the development process and will facilitate the developers and the professional teams to plan, design, build, manage and operate sustainable Townships.

It is clear the worst scenarios of climate change due to the global effects of carbon emissions and climate change should not be taken lightly. The building and construction sector account for about 40% of the world’s energy consumption, and it is significantly to climate change and global warming due to the increasing concentration of greenhouse gases. The Green Building Index Township Tool sets out a vision for sustainability within the built environment which provides guidance to assist State and Local authorities, developers, builders and professionals to deliver more environment-friendly and sustainable Townships and communities.

The government is very serious in its effort to address the effects of climate change and global warming and the need to shift towards green technology and products, as the key driver to achieve a high-income but low-carbon economy so as to enhance the quality of life and to ensure a better future for all Malaysians.

Once again, I congratulate and applaud the initiatives and efforts of Green Building Index who with the full support of the building, housing and property industry has developed these important and significant rating tools for Township and Residential developments in Malaysia. I support and wish you every success in its implementation.

"I Malaysia" People First. Performance Now.

YAB DATO’ SRI MOHD NAJIB BIN TUN HAJI ABDUL RAZAK

MESSAGE FROM

YB DATO’ SRI MOHD NAJIB BIN TUN HAJI ABDUL RAZAK

Prime Minister of Malaysia

I am honored to launch the Green Building Index Township Tool and Residential New Construction Tool Version II on 29 March 2011. The introduction of these new Tools to widen the green transformation to our neighbourhoods and communities is both significant and timely. It is significant as the Township Tool and its framework takes it to another level and sets out a vision for sustainability within the built environment and provides guidance to assist developers, professional and construction teams to deliver sustainable Townships. It is timely as we must look beyond the construction of green buildings alone for the long term viability of our society. Green buildings are key component of a sustainable society, but the construction of green buildings alone will never allow us to effectively address issues that are outside the scope of an individual building.

I am proud that the professional architects and engineers of Green Building Index have taken the pioneering initiative and so much effort to develop these Tools. I am given to understand the marks the culmination of over 18 months of public consultation with stakeholders including Government Agencies, Local Authorities and international peers and expert groups to establish a relevant local framework for Malaysia.

With the introduction of this Township Tool, it will provide an opportunity for the application of public-private smart partnership approach throughout the development process that will facilitate the Government Agencies and Local Authorities, developers and the professional teams to work together to generate places that are well planned and designed, safe and secure, and enhance the surrounding environment.

As we transform to a high-income economy, we must be ready to change the old ways of doing things. The Green Building Index Township Tool now offers us an opportunity to develop neighbourhoods and communities in a more environment-friendly and sustainable way to enhance the quality of our lives.

The successful implementation of Green Building Index for sustainable Townships and green buildings coupled with the people’s will to change the way we have been living will help ensure a better future for all Malaysians.

YB DATO’ SRI PETER CHIN FAH KUI

Minister of Energy, Green Technology and Water

MESSAGE FROM

YB DATO’ SRI PETER CHIN FAH KUI

Minister of Energy, Green Technology and Water

Congratulations to Green Building Index for the launch of Green Building Index Township Tool and Residential New Construction Tool Version II on 29 March 2011.

Burgeoning building, housing and property sectors are amongst the largest energy consumers. Escalating energy prices, better environmental awareness, stricter regulations and intense worldwide rivalry for green products and services call for innovative solutions that are able to transform building economic and environmental pressures into sources of competitive advantage.

Energy efficiency is fundamental to reducing fossil fuel usage within the built environment and the Green Building Index Initiative is a strategic approach to improving the efficiency and sustainability of new Malaysian Townships. The professional architects and engineers of the Green Building Index are leading the way in developing a framework for high-performance cities that minimize water consumption and waste production.

I commend the Green Building Index for fostering Corporate Social Responsibility among players in the energy, water and green technology segments via the inception of both the Township Tool and Version II of the Residential New Construction Tool.

With the introduction of these Tools, I hope that the building industry will find them useful in their effort to build more “Green Buildings” in the country.

YB DATO’ SRI PETER CHIN FAH KUI

Minister of Energy, Green Technology and Water

MESSAGE FROM

YB DATO’ SRI PETER CHIN FAH KUI

Minister of Energy, Green Technology and Water
SUSTAINABLE TOWNSHIPS
BUILDING BETTER GREEN COMMUNITIES

What is a Sustainable Township?
Sustainable Townships are livable places that meet the diverse needs of the community, both now and in the future. They are places that are well planned and designed, safe and secure, and enhances the surrounding environment, thus providing a high quality of life for the people who live, work and play there.

Drivers for Sustainable Development
Climate change and the impacts of global warming have forced both governments and industry to make substantial changes to the way that they operate and function – the old business-as-usual adage is no longer acceptable in anyone’s language.

In recognition of this, the Malaysian Government has taken a significant step forward, especially as a developing nation, by committing to a minimum reduction of 40% of its carbon emissions by 2020 (based on 2005 carbon emission levels).

It must be noted, that the reduction of carbon emissions is only part of the solution, there is a clear need for a holistic approach to addressing sustainability issues, an approach that incorporates both mitigation and adaptation measures.

Countries throughout the globe have adopted various approaches and strategies for addressing climate change and driving sustainable development. The Malaysian Government has set a range of ambitious policies and targets – what is now needed is a vehicle for the implementation and delivery of projects that support the government’s goals.

What is the GBI Township Tool?
Green Rating tools are conceived to be able to assist architects, planners, designers, builders, property owners, government bodies, developers and end users to understand the impact of each design choice and solution towards being more environment-friendly.

The Malaysian Green Building Index was created to provide the building industry a common and verifiable mechanism to benchmark green property development.

The GBI Township Tool takes it to another level and sets out a vision for sustainability within the built environment and provides guidance to assist end users to deliver sustainable townships.

GBI Township Tool Points Allocation Chart

Core categories for the delivery of Sustainable Townships in Malaysia

1. Climate, Energy & Water
Sustainable Townships are balanced in their ongoing production and consumption of energy and water

2. Ecology & Environment
Sustainable Townships respect their surrounding environment and native ecological systems

3. Community Planning & Design
Sustainable Townships are planned and designed for the benefit of the community

4. Transportation & Connectivity
Sustainable Townships are well-connected places that have a broad range of transportation options

5. Building & Resources
Sustainable Townships have a lower impact on resources – by applying the ‘more from less’ principle

6. Business & Innovation
Sustainable Townships are tailored to respond to local needs in creating business and employment whilst incorporating innovative solutions

They are water neutral – through the reduction of mains water consumption, rainwater harvesting and greywater recycling.

They are sensitive to the needs of the local ecology & biodiversity and aims to preserve and enhance the ecological value of the natural environment.

They assist in stabilising land – subsidence by reducing the impact of flooding and erosion.

They have excellent accessibility, connectivity and are well linked to surrounding districts.

They make good use of existing transport links and make priority and provision for future services – such as rail, bus and cycling networks.

They provide employment opportunities for its residents to work closer to their homes and schools. They provide avenues for businesses to form and flourish.

They demonstrate best practices through the implementation of innovative technologies and solutions at many different levels of the township.
GREEN BUILDING INDEX

HEREBY REGISTERS

ELMINA EAST
SIME DARBY PROPERTY BERHAD

AS
PILOT PROJECT
FOR THE
GBI TOWNSHIP TOOL

29 MARCH 2011

AR. BOM CHE WEE
Chairman
GREEN BUILDING INDEX EXTERNAL QUALIFICATION PANEL.

GBI BILINGUAL
DIN Sdn Bhd
A & B, Jalan Seputeh, Mid Valley City, 59200 Kuala Lumpur.
Tel: 603 2277 6700
Fax: 603 2277 6702
www.greenbuildingindex.org
www.greenbuildingindex.com
7th JUNE 2011

GREEN FACTORIES

GBI INDUSTRIAL NEW CONSTRUCTION (INC) &
GBI INDUSTRIAL EXISTING BUILDING (IEB)
RATING TOOLS

7 June 2011

MESSAGE FROM
YAB DATO’ SRI MOHD NAJIB
BIN TUN HAJI ABDUL RAZAK
PRIME MINISTER OF MALAYSIA

DEMONSTRATING GLOBAL LEADERSHIP

First and foremost, I take great pride to congratulate the professional Architects and Engineers of Green Building Index (GBI) for the launch of GBI Industrial New Construction (INC) Tool and Industrial Existing Building (IEB) Tool on 7 June 2011 at Hilton Kuala Lumpur.

Profound policies for the environment have always been a cornerstone of our government's plan ever since I pledged at the 15th United Nations Framework Convention on Climate Change (COP 15) in Copenhagen to reduce Malaysia's carbon dioxide emissions intensity by up to two fifths by the year 2020, as compared to 2005 levels, conditional upon transfer of technology and finance from developed nations. Since then, we have already attained much with the inception of Green Building Index, Malaysia’s very own sustainable built environment rating system; investments in emerging green technologies and establishment of the RM1.5 billion green investment fund vehicle.

Today I am pleased to announce further strides in the right trajectory, with the well-timed launch of Green Building Index’s Industrial New Construction and Industrial Existing Building Tools. Our national competitiveness is inter-related to our capability to conserve our indigenous resources while safeguarding the environment. The commendable efforts of Green Building Index derives synergy from tapping into the largest energy user segment where three fifths of national energy is consumed by industrial players while simultaneously conserving rapidly depleting fossil fuels and environmental air quality via well-thought-out, transit-oriented development for both factory workers and manufacturing logistics alike.

We are demonstrating global leadership once again by being the first nation in the world to support a green industrial building assessment tool that takes into account holistically the resource efficiency of its manufacturing processes via Green Building Index. The spillover effect of this is not inconsequential, as high-value, high tech industries and services such as photoelectric and biomass technologies will be able to drive high value-added growth, translating into more business and job opportunities for the local economy and thus contributing significantly towards our Gross National Income.

We now have a chance to do things differently and to break from the status quo. It is an opportunity we cannot shy away from, and which we will all be judged in years to come. Employing green technology as our new growth engine is a must. Such is now the demand of an increasingly environment-conscious global marketplace as we transition to a sustainable and secure common future, that of high-income economic growth decoupled from environmental pressures.

Congratulations once again to Green Building Index, a realisation borne out of the private sector led by professional architects and engineers with the full support of the manufacturing industry working in tandem with government-initiated economic drivers towards a high-income economy and low-carbon environment by 2020. I support and wish Green Building Index every success in its implementation.

1 Malaysia “People First. Performance Now.”

YAB DATO’ SRI MOHD NAJIB BIN TUN HAJI ABDUL RAZAK
PRIME MINISTER OF MALAYSIA
GBI Tool Development 2009 - 2015

3. Non-Residential Existing Building (NREB) 28th April 2010
4. Township 29th March 2011
5. Industrial New Construction (INC) 7th June 2011
6. Industrial Existing Building (IEB) 7th June 2011
7. NRNC: Retail 21st May 2011
8. NREB: Retail 21st May 2011
9. NRNC: Data Centre 11th January 2012
10. NREB: Data Centre 21st February 2013
12. GBI Hotel & Resort Tool 27th February 2014
13. NRNC: Hospital Tool 23rd September 2015
14. NREB: Hospital Tool 23rd September 2015
Fig 3: BSEEP - Forecast No. of EE Buildings
BEI \leq 136 \text{ kWh/m}^2/\text{yr}

Source: BSEEP Malaysia Final Project Document
600 tKg CO2

Source: BSEEP Malaysia Final Project Document
GROSS FLOOR AREA (GFA) OF GBI CERTIFIED BUILDINGS

NRNC: 5,784,227.26 GBI Certified GFA (Sqm)
RNC: 7,303,628.32 GBI Certified GFA (Sqm)
NREB: 916,407.88 GBI Certified GFA (Sqm)
IEB: 28,519.80 GBI Certified GFA (Sqm)
INC: 229,320.04 GBI Certified GFA (Sqm)

TOTAL as of 15 JANUARY 2016: 14,262,103.30 (153,516,002.30sqft)

CARBON DIOXIDE (CO2) EMISSION REDUCTION OF GBI CERTIFIED BUILDINGS

NRNC: 457,485.99
RNC: 184,211.61
NREB: 78,607.93
INC: 12,371.70
IEB: 2,480.24
TOTAL: 735,157.46

CO2 Emission Reduction: (tCO2e/annum, based on electricity energy reduction only @ 1kWh = 0.741 kg CO2 - Peninsular / 0.872 kg CO2 - Sarawak / 0.546 kg CO2 - Sabah)
# GBI Certified Projects by Rating Categories

<table>
<thead>
<tr>
<th>Rating</th>
<th>NRNC</th>
<th>RNC</th>
<th>INC</th>
<th>NREB</th>
<th>IEB</th>
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<th>Total as of 15 January 2016</th>
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<tr>
<td><strong>Platinum</strong></td>
<td>9</td>
<td>4</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>15 (4%)</td>
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<td>Above 86 Points</td>
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<td>1</td>
<td>1</td>
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<td>76 - 85 Points</td>
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<td><strong>Silver</strong></td>
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<td>2</td>
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<td>-</td>
<td>2</td>
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<td>66 - 75 Points</td>
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<td>Certified</td>
<td>93</td>
<td>95</td>
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<td>7</td>
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<td><strong>Total Certified</strong></td>
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<td>9</td>
<td>11</td>
<td>3</td>
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## GBI Certified Projects by State/Territory

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<td>Selangor</td>
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<td>Penang</td>
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<td>23</td>
</tr>
<tr>
<td>Melaka</td>
<td>56</td>
<td>22</td>
</tr>
<tr>
<td>Sarawak</td>
<td>17</td>
<td>8</td>
</tr>
<tr>
<td>Sabah</td>
<td>12</td>
<td>4</td>
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<tr>
<td>Negeri Sembilan</td>
<td>11</td>
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</tr>
<tr>
<td>Kelantan</td>
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<td>2</td>
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<tr>
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<tr>
<td>Pahang</td>
<td>7</td>
<td>4</td>
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<tr>
<td>Labuan</td>
<td>3</td>
<td>-</td>
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<tr>
<td>Total</td>
<td>667</td>
<td>340</td>
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</tbody>
</table>

**GBI Registered Projects by State/Territory:**

Total GBI Registered Projects by State/Territory: **667**

**GBI Certified Projects by State/Territory:**

Total GBI Certified Projects by State/Territory: **340**
LANDMARK MALAYSIAN GREEN BUILDINGS
PTM GEO BUILDING

HAS BEEN AWARDED

CERTIFIED

OWNER: Pusat Tenga Malaysia
ARCHITECT: Environ Building Architects
ENERGY CONSULTANT: ICV Consultants
MAIN CONTRACTOR: Petra Perdana Construction Sdn Bhd

GREEN BUILDING INDEX CERTIFICATE NO. GBI-NRNC-0001
DATE OF ISSUANCE: 24 JULY 2009
VALID UNTIL: 23 JULY 2012

DR. ROKIM YUS
CHIEF EXECUTIVE OFFICER

PAM CERTIFIED ASSOCIATION MALAYSIA

PAM 2010-2011

WORLDWIDE ASSOCIATION CLEANSING THE GREEN REVOLUTION
BANGUNAN SURUHANJAYA TENAGA
NO. 12 JALAN TENAGA, PREMIP 2, 41100 PUCHONG, SELANGOR, MALAYSIA

HAS BEEN AWARDED

GREEN BUILDING INDEX
PLATINUM

OWNER: Suruhanjaya Tenaga
ARCHITECT: M.Arch Bhd
CONSULTANT: Projectürs Holdings Sdn. Bhd
EPC CONSULTANT: AECOM Engineering Sdn. Bhd
FACILITY MGR.: Kergo Malaysia Sdn. Bhd
CONTRACTOR: Pro Barana Construction Sdn. Bhd

DR. BINAYA WIE
Chairman, GBI

DESIGNED/BUILT/OWNED BY: Sdn. Bhd

PAM
PERSATUAN ARSITEK MALAYSIA

INTERNATIONAL ARCHITECTS LEADING THE GREEN REVOLUTION
2012

GREENER MALAYSIA
Over 26 Million Square Feet of Green Building in 3 years
2013

75 MILLION SQUARE FEET CERTIFIED GREEN BUILDINGS

GREENING MALAYSIA ONE BUILDING AT A TIME
CERTIFIED GREEN BUILDINGS
GREEN BUILDING INDEX
2009 - 2014
100 MILLION SQUARE FEET
GBI Awarded TOP 30 GREEN CATALYST 2014 BY MGTC
Malaysia had already reduced the emissions intensity of its GDP by more than 33% despite facing difficulties in fulfilling the pledge made in Copenhagen 6 years ago.

“I am pleased to be able to announce that by the end of 2015, Malaysia is projected to have achieved a reduction in the greenhouse gas intensity of GDP of 35 percent.”
National Initiatives in Encouraging (EE) - cont.

2002
- Energy audit on government buildings
- EE and RE in education curriculum and university courses

2006
- Development of EE guidelines for Malaysian Industries

2008
- Efficient Management Of Electrical Energy Regulations

2009
- Green Building Index (GBI)

2013
- Minimum Energy Performance Standards (MEPS)
**National Initiatives in Greening the Building Sector**

**Green Building Tools/ Guides in Malaysia (cont.)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Green Building Tools/ Guides</th>
<th>Description</th>
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<tbody>
<tr>
<td>2.</td>
<td>Green Building Index (GBI)</td>
<td>• Launched in 2009</td>
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<tr>
<td></td>
<td></td>
<td>• The index is based on criteria which are:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(i) energy &amp; water efficiency;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ii) Indoor environmental quality;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(iii) Usage of recyclable &amp; environment friendly material; and</td>
</tr>
<tr>
<td></td>
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<td>(iv) adoption of new technology.</td>
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<td></td>
<td></td>
<td>• Achievement (till 15/10/2014):</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>334</strong> buildings certified (152 million sqft)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>0.73</strong> MtCO$_2$eq of emission reduction by GBI certified buildings</td>
</tr>
</tbody>
</table>
EDUCATION – KEY TO FUTURE
GREEN BUILDING PROFESSIONALS
GBI FACILITATOR COURSE

OBJECTIVE

The GBI Facilitator Course is a 3-day training course that covers all aspects of the GBI certification process for buildings, including all the tools and application procedures.

The GBI Facilitator Course is open to all. Completion of the full course is required for participants to qualify for the GBI Facilitator Examination. A participant must attend not less than nine modules of the GBI Facilitator Course to complete the course.

PRE-REQUISITES TO BE GBI FACILITATORS

Participants who intend to be GBI Facilitators must fulfill the following pre-requisites:

1. A registered professional member of Board of Architects, Board of Engineers or Board of Quantity Surveyors;
   OR
   A recognised degree in architecture, engineering, quantity surveying or other building related disciplines as approved by the GBI Accreditation Panel; and a minimum of 3 years relevant working experience acceptable to the GBI Accreditation Panel;
   OR
   Other Building practitioners with a minimum of 5 years relevant working experience acceptable to the GBI Accreditation Panel;
   AND
2. Successfully completed the GBI Facilitator Course.
2800 candidates trained over 31 sessions since May 2009

Basic course being included in tertiary syllabus

Towards Self-certification for Certified Level
INTERNATIONAL SERIES 2010
THE PLANNING OF SINO-SINGAPORE TIANJIN ECO-CITY
+ UPDATE ON GBI MALAYSIA

SPEAKER
TAN SIONG LENG
DEPUTY CHIEF EXECUTIVE OFFICER (URA CONSULTING & CORPORATE DEVELOPMENT), URBAN REDEVELOPMENT AUTHORITY, SINGAPORE

22 APRIL 2010
8.30am - 12.30pm (Half Day)
Sime Darby Convention Centre
CPD Points have been applied

ADMISSION IS FREE
(First-come-first-served basis)
INTERNATIONAL SERIES 2010
LONDON 2012 OLYMPICS
+ PILOT LAUNCH OF GBI TOWNSHIP TOOL

4 DECEMBER 2010
SATURDAY
9.30am - 1.30pm (Half Day)
One World Hotel

JOINTLY ORGANISED BY

SUPPORTED BY
INTERNATIONAL SERIES 2012
30 STOREY GREEN BUILDING CONSTRUCTED IN 15 DAYS
+ UPDATE ON GBI MALAYSIA

TUESDAY
12 JUNE 2012
9.00am - 1.00pm
One World Hotel, Ballroom

ADMISSION FEES
RM80
(First-come-first-served basis)

GREEN TOWER: THE SHAPE OF THINGS TO COME
A 30-storey five-star hotel was completed within a record 15 days in the Hunan Province of China last December, by BROAD Group, a Chinese construction company which specialises in sustainable architecture.

Titled as the T30, the steel structure that houses the Ark Hotel has been built using pre-fabricated modules. Apart from the astounding speed at which the building was erected, the structure boasts a number of highly-sophisticated features that push the boundaries of construction technology while providing the benefits of lower cost, higher energy efficiency, superior indoor air quality and environment friendliness.

MITIGATING CLIMATE CHANGE WITH BROAD BUILDING PRESCRIPTIONS
Juliet Jiang will elaborate on BROAD Group’s green philosophy and perspective on sustainable buildings. The talk covers BROAD sustainable buildings (BSB) with its sustainability derived from 8 aspects: earthquake resistance, energy conservation, air purification, durability, material saving, recyclable construction materials, construction materials free of formaldehyde, lead, radiation & asbestos; and no construction waste, dust or noise. BROAD illustrates the way BSB has accomplished the extremity of these 8 aspects with construction speed that current human technologies can achieve.

SPEAKER
JULIET JIANG
Senior Vice President,
BROAD Group

Juliet Jiang graduated from Wuhan University with a master’s degree in 1989. She spent a decade as the general manager for Hunan Import & Export Corp, handling export businesses. Juliet Jiang joined BROAD Group in 1998 to spearhead BROAD International as CEO. Her impressive credentials include exporting BROAD’s non-electric, energy-saving air conditioning to more than 70 countries. Since then, Juliet Jiang has become Senior Vice President of BROAD Group and established BROAD International Sustainable Buildings (BSB) in 2010 that has propelled her to world-class achievements in the field of construction and development.

To register, log on to www.greenbuildingindex.org to download the registration form.
For more information call +603 2283 2566 or email info@greenbuildingindex.org
T 03 2283 2566  F 03 2284 2566  E info@greenbuildingindex.org  W www.greenbuildingindex.org
Pre-registration
General Enquiry
Preliminary Consultation for Prospective Applicant

Post-registration
Design Assessment Consultation
Completion and Verification Consultation
KEY INFORMATION SOURCE FOR GREEN BUILDINGS

www.greenbuildingindex.org
R&D – KEY TO FUTURE MALAYSIAN GREEN BUILDINGS
TEST RESULTS OF HEAT FLOW METER BASED ON ISO 8301, ASTM C-518 & MS 2095 TEST METHODS FOR REFLECTIVE INSULATION

A Joint Research Collaboration Project between SERI UKM & GBI Sdn Bhd

(Test samples and rig were provided by San Miguel Yamamura Woven Products Sdn Bhd.)

Date: 8 October 2015
HEAT FLOW METER: MODEL FOX 600
TEST METHOD: ISO 8301, ASTM C-518
PLATE TEMPERATURE SETTINGS ACCORDING TO MS 2095:2014

- Temperature of hot and cool plate shall be 35°C and 20°C, with temperature difference of 15°C [Section 5.6.2 Test Method, clause (d)]
- Specimen size 600mm x 600mm
- Types of reflective foil used are Big bubble foil, small bubble foil, woven foil and metalized foil.
- Variable top & bottom air gaps = 25mm, 50mm, 75mm and 125mm
TYPES OF REFLECTIVE INSULATION FOIL

Big Bubble Foil

Woven Foil

Small Bubble Foil
TOTAL AIR GAP ANALYSIS FOR BUBBLE FOIL

Comparison of R-Value (G 202A)

<table>
<thead>
<tr>
<th>Air Gap</th>
<th>Top Air Gap 25mm</th>
<th>Top Air Gap 50mm</th>
<th>Top Air Gap 75mm</th>
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<tr>
<td>50</td>
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<td>1.6082</td>
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<tr>
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<td>1.6082</td>
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<tr>
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<tr>
<td>175</td>
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<td>1.9491</td>
<td>2.1947</td>
</tr>
</tbody>
</table>
TOTAL AIR GAP ANALYSIS FOR WOVEN FOIL

Comparison of R-Value (WF 202A)

<table>
<thead>
<tr>
<th>Air Gap</th>
<th>Top Air Gap 25mm</th>
<th>Top Air Gap 50mm</th>
<th>Top Air Gap 75mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
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<tr>
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<tr>
<td>150</td>
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<td>2.0134</td>
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<tr>
<td>175</td>
<td>1.7474</td>
<td>1.9521</td>
<td>2.0193</td>
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</tbody>
</table>
Title: Field evaluation on Radiant Barrier and Reflective Insulation Products in hot and humid climatic conditions.
Construction of Test Cells

3 test cells were built with the dimension of 2200mm (width) x 2500mm (length) x 3323mm (height).

The distance between each test cell is about 1900mm apart.
Construction of Test Cells

The walls (including the attic area) are constructed using metal framing with 3-4mm cement board (external) and gypsum board (internal).

The floor is using 12mm plywood (external and internal).

Both wall and floor cavities are...
The roofs are designed that the roof types, battens, insulation materials (radiant barrier or reflective insulation), fascia board and its overall configuration can be changed easily.
Location of Pyranometer

Pyranometer is installed to capture irradiance from the sunlight.

Pyranometer only available at Test Cell 2.
Results – Attic Ambient Temperature

Comparison on Attic Temperature (TP 125)

Max: 46.1°C
Max: 43.3°C
Max: 37.2°C
Max: 36.7°C
Results – Room Ambient Temperature

Comparison on Room Temperature (TP 125)

Max: 43.3°C
Max: 38.2°C
Max: 34.8°C
Max: 33.7°C

Legend:
- Environment °C
- Room (TC1) °C
- Room (TC2) °C
- Room (TC3) °C
Comparison of R-Value for different air gaps

- 17-28 Jun
- 1-11 Jul
- 23-29 Jul
- 6-16 Aug

R-Value (m²K/W) vs. Airgap (mm)
FUTURE DIRECTIONS FOR GBI
1. MORE TOOLS UNDER DEVELOPMENT
According to industry needs, under development are:
REB – Residential Existing Building
NRNC2 – Update of Non-Residential New Construction
TOWNSHIP2 – Update Township Tool

2. NEW LANDMARK BUILDINGS.
The MGBC NEW HQ Building. A Next Gen Grid (Green Research Innovation Design) Green Building

3. EDUCATION AND R&D
GBI Professionals Training
More funding for Tropical Green Architecture

4. FINANCIAL STIMULUS FOR GREEN INDUSTRY.
GBI is pursuing with MGTC extension of the Tax Incentives for GBI Certified Buildings to 2020 along with services from GBI Facilitator Firms
ONE BUILDING AT A TIME
QUESTIONS?

Ar. Chan Seong Aun
chanseongaun@gmail.com
www.greenbuildingindex.org