



**green building index**

**NEW LIFE FOR OLD**

**PLUGGING THE LEAKS IN EXISTING BUILDINGS**

26<sup>th</sup> April 2010



**green building index**

**Update on GBI Malaysia**

## Significant Developments since 21/5/09 launch of GBI

- Over 1,000 GBI Facilitators trained
- 7 GBIF courses conducted to-date
- 123 Registered Facilitators listed on website another 100+ approved for listing
- Guide on GBIF Scope of Works & Fees
- Commissioning Specialists CxS listed on website
- On-going roadshows on BEIT software conducted by ACEM

# Significant Developments

## since 21/5/09 launch of GBI cont'd

- Government incentive for GBI announced in Oct 2009 10MP budget
- Tax exemption and Stamp Duty incentive scheme details firmed up
- GBI Certificate issued by Board of Architect with Green Cost indicated

## Significant Developments since 21/5/09 launch of GBI cont'd

- Over 80 applications received
- DA submissions = 6
- Pre-certifications issued
- 1 GBI certificate issued
- Reference Guide for Facilitators updated on website

# Significant Developments

## since 21/5/09 launch of GBI cont'd

- GBI Rating tool for Non-Residential Existing Building - launch 26 April 2010
- New Rating tools in the pipeline are:
  - Township tool
  - Industrial/Factory tool



# GBI – EXISTING BUILDING RATING TOOL

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FASHRAE, FIFireE, PEng  
26<sup>th</sup> April 2010

Intelligent Building

EE Building

Green Building

Sustainable Building

High Performance Building  
Green

Green Building

80'S

Grade 1 Office

Grade A Office

Grade A+ Office

Sustainable  
Eco City

Carbon  
Negative  
City

ECO-City

Carbon  
Neutral  
City

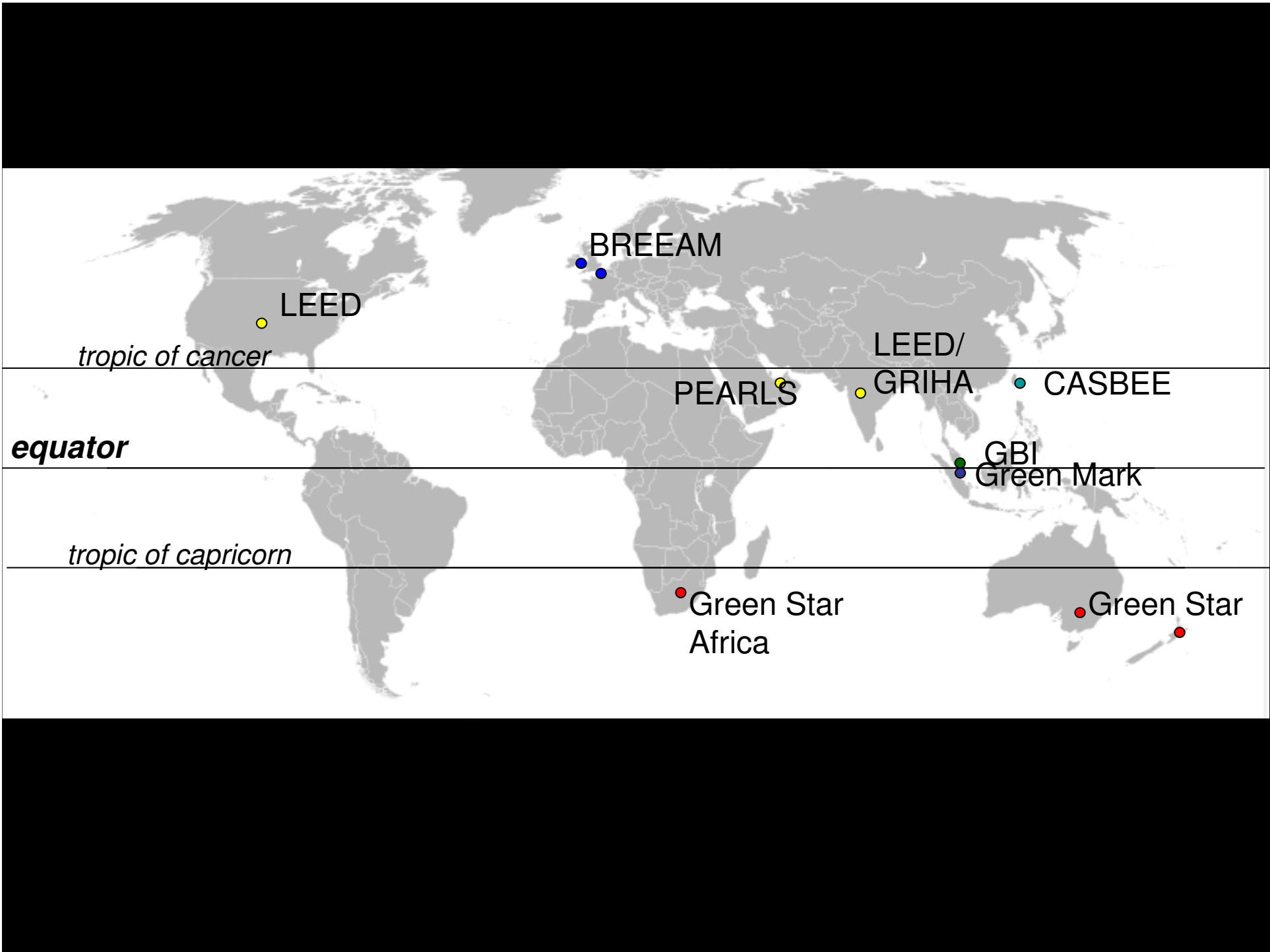
New Millennia



# Global Green Building Tools

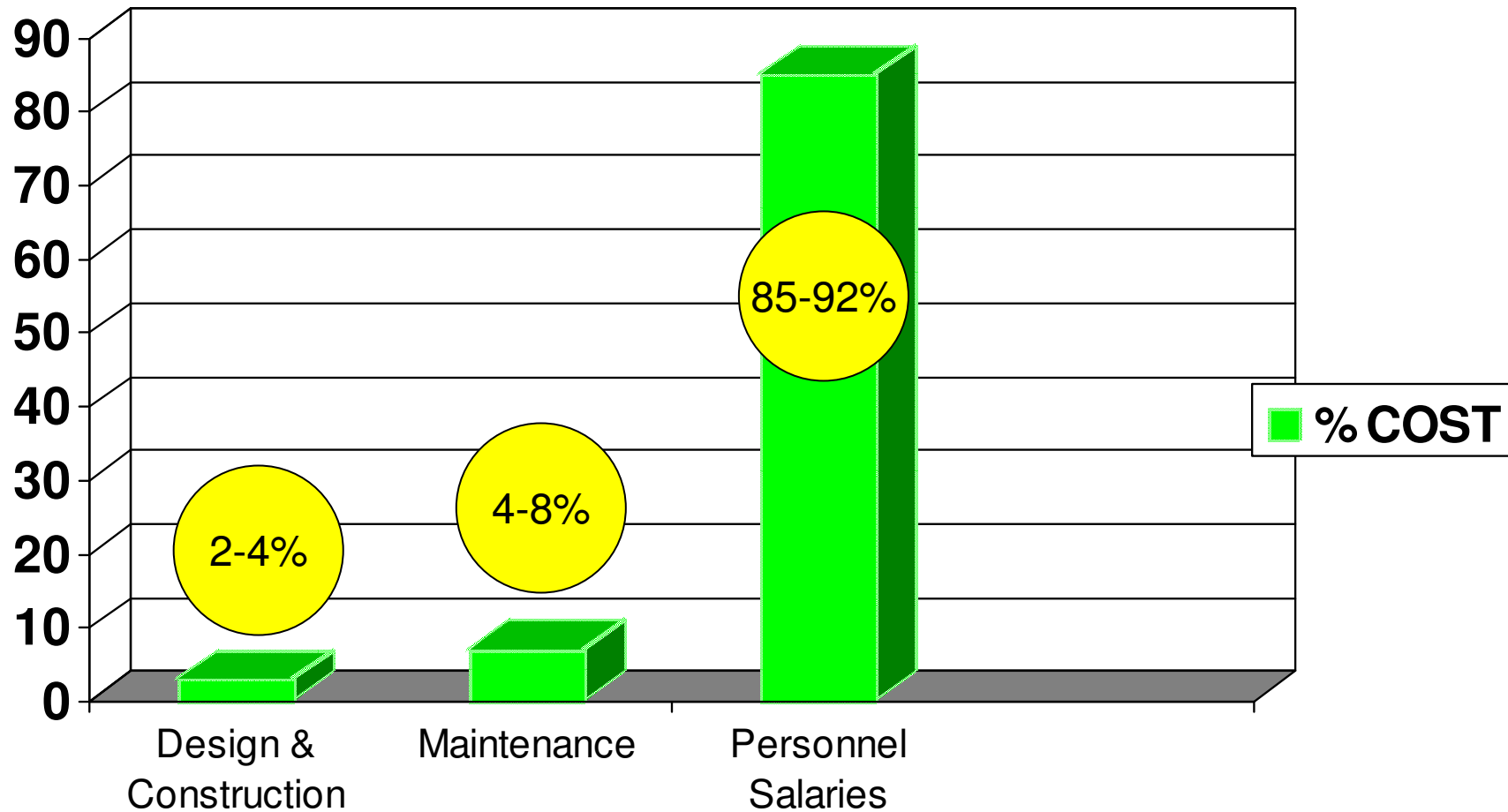
	•	Australia	: Nabers / Green Star
	•	Brazil	: AQUA / LEED Brasil
	•	Canada	: LEED Canada / Green Globes
	•	China	: GBAS
	•	Finland	: PromisE
	•	France	: HQE
	•	Germany	: DGNB / CEPHEUS
	•	Hong Kong	: HKBEAM
	•	India	: LEED India/ GRIHA
	•	Italy	: Protocollo Itaca
	•	Mexico	: LEED Mexico
	•	Netherlands	: BREEAM Netherlands
	•	Portugal	: Lider A
	•	Singapore	: Green Mark
	•	Spain	: VERDE
	•	United States	: LEED/ Green Globes
	•	United Kingdom	: BREEAM

Australia	Green Star	2005
Canada	LEED Canada	
Germany	German Sustainable Building Certification	
Japan	CASBEE	
New Zealand	Green Star NZ	
South Africa	Green Star SA	
United Kingdom	BREEAM	1990
United States	LEED	1996
Malaysia	Green Building Index	2009
Singapore	Green Mark	2005
UAE	Pearl Design System_2010	2010
India	GRIHA	2010
Vietnam	Under Development	
Philippines	BERDE	
Thailand	Under Development	
Indonesia	Under Development	
Switzerland	Minergie	

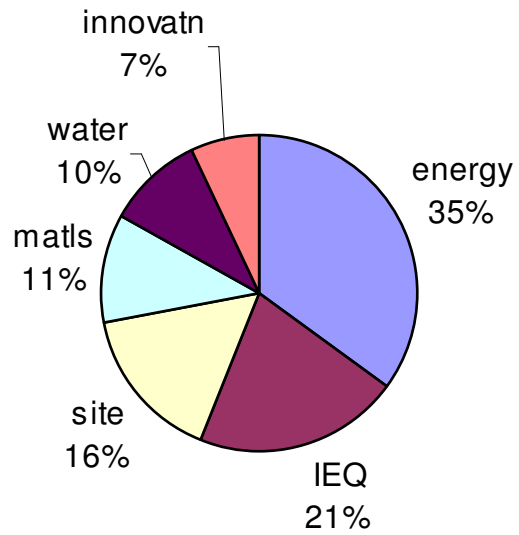


# Life Cycle Cost

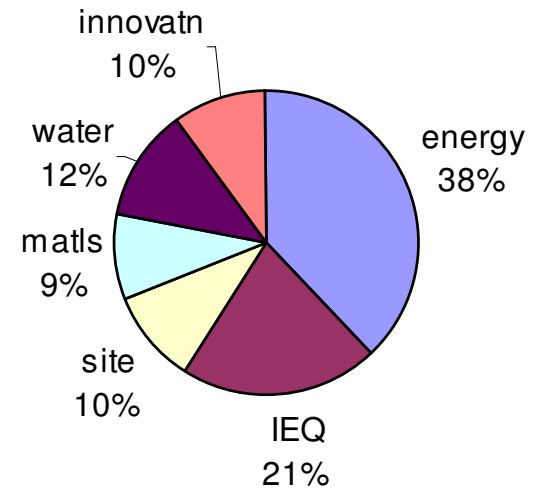
## 30 year cost of a building



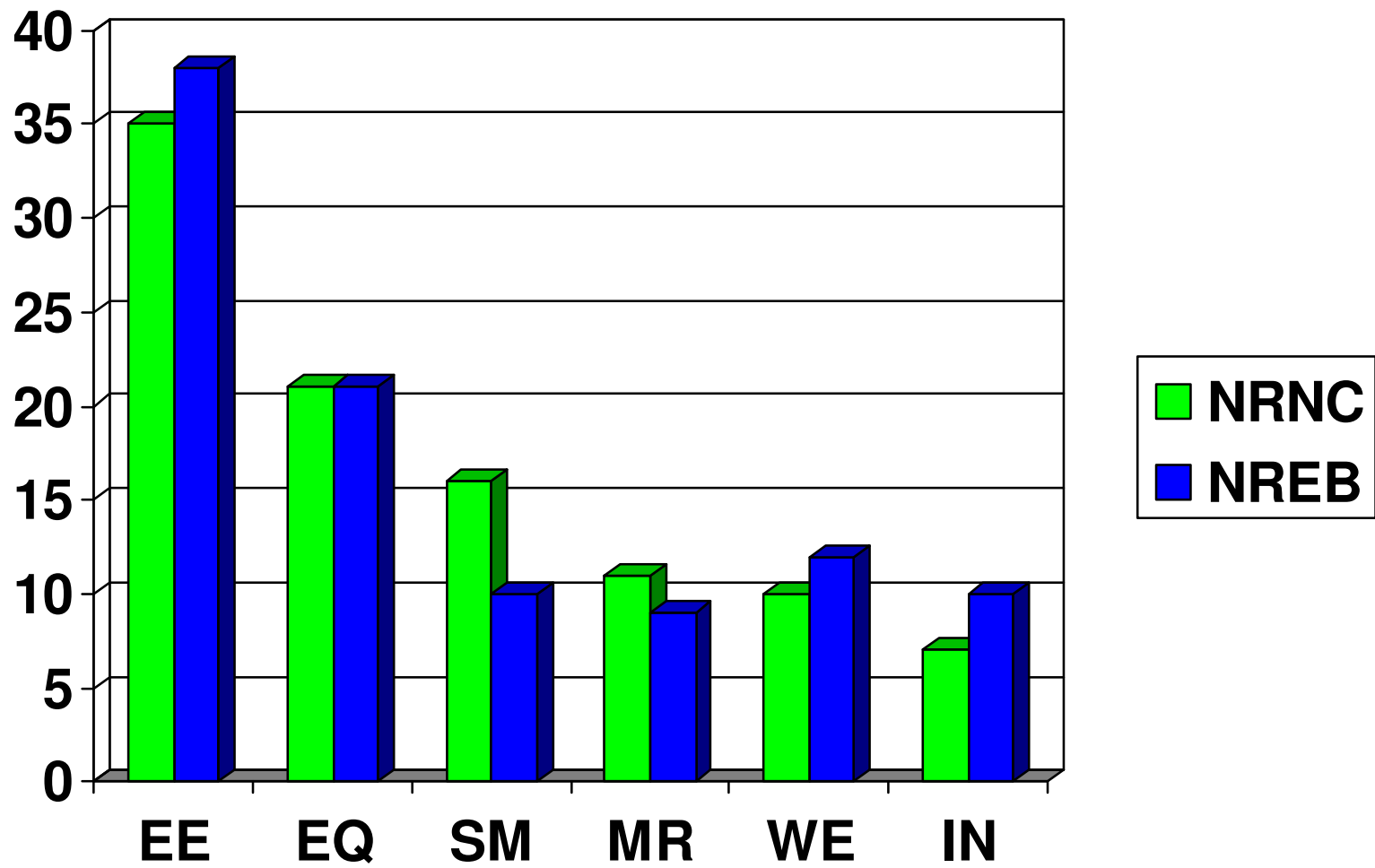
# Green Building Index



**NRNC**



**NREB**



# GBI Rating Tools and Concepts

## GBI VERSION 1.0

- **No Pre-requisite / Mandatory criteria**
- **Maximum score 100 points**
- **No bonus points**
- **Validity 3 years**

# 1) Energy Efficiency

**38 points**

<b><i>Design &amp; Performance</i></b>		
EE1	Minimum EE Performance	2
EE2	Lighting Zoning	3
EE3	Electrical Sub-Metering	2
EE4	Renewable Energy	5
EE5	Advanced Energy Performance - BEI	15
<b><i>Commissioning</i></b>		
EE6	Enhanced or Re-commissioning	4
EE7	On-going Post Occupancy Commissioning	2
<b><i>Monitoring, Improvement &amp; Maintenance</i></b>		
EE8	EE Monitoring & Improvement	2
EE9	Sustainable Maintenance	3



## EE4 Renewable Energy

5

Encourage use of renewable energy:-

Where 0.25 % of the maximum electricity demand (M.D.) is supplied by Renewable Energy (RE) or 2 kWp RE is installed, whichever is the greater, OR	1
Where 0.5 % of the maximum electricity demand (M.D.) is supplied by Renewable Energy (RE) or 5 kWp RE is installed, whichever is the greater, OR	2
Where 1.0 % of the maximum electricity demand (M.D.) is supplied by Renewable Energy (RE) or 10 kWp RE is installed, whichever is the greater, OR	3
Where 1.5 % of the maximum electricity demand (M.D.) is supplied by Renewable Energy (RE) or 20 kWp RE is installed, whichever is the greater, OR	4
Where 2.0 % of the maximum electricity demand (M.D.) is supplied by Renewable Energy (RE) or 40 kWp RE is installed, whichever is the greater.	5

## **EE5 Advanced Energy Performance - BEI**

**15**

Encourage developments to strive for world class EE standards.

<b>Exceed EE performance better than the baseline minimum to reduce energy consumption in the building. I) Achieve Building Energy Intensity (BEI) <math>\leq</math> 150 kWh/m<sup>2</sup>.yr as defined under GBI reference, OR</b>	<b>2</b>
<b>BEI <math>\leq</math> 140, OR</b>	<b>3</b>
<b>BEI <math>\leq</math> 130, OR</b>	<b>5</b>
<b>BEI <math>\leq</math> 120, OR</b>	<b>8</b>
<b>BEI <math>\leq</math> 110, OR</b>	<b>10</b>
<b>BEI <math>\leq</math> 100, OR</b>	<b>12</b>
<b>BEI <math>\leq</math> 90, OR</b>	<b>15</b>

## **EE5 Advanced Energy Performance - BEI**

**15**

II) Demonstrate Energy savings over the last 3 years from Existing Building historical BEI baseline, to improve by:

$\geq 20\%$  AND with resultant BEI  $\leq 200$

**2**

$\geq 25\%$  AND with resultant BEI  $\leq 180$

**3**

$\geq 30\%$  AND with resultant BEI  $\leq 150$

**5**

$\geq 40\%$  AND with resultant BEI  $\leq 140$

**8**

$\geq 50\%$  AND with resultant BEI  $\leq 130$

**10**

$\geq 60\%$  AND with resultant BEI  $\leq 120$

**12**

$\geq 70\%$  AND with resultant BEI  $\leq 110$

**15**

## EE6 Enhanced Commissioning/Re-Commissioning/Retro Commissioning of Building Energy Systems

4

Ensure expensive installations are properly commissioned to realise their full potential.

Ensure building's energy related systems are properly commissioned so as to realise their full potential. Appoint a GBI recognised Commissioning Specialist (CxS) to perform the commissioning for all the building's energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard by:-

a) Implement improvements to ensure building's major energy using systems are repaired, operated and maintained effectively to optimize energy performance.		
b) Develop a commissioning or ongoing commissioning plan for the building's major energy-using systems.	4	
c) Provide training for management staff to build awareness and skills in a broad range of sustainable building operations topics, including energy efficiency and building, equipment and systems operations and maintenance.		
d) Update the building operating plan as necessary to reflect any changes in the occupancy schedule, equipment runtime schedule, design set points and lighting levels.		

## EE7 On-Going Post Occupancy Commissioning

2

Educate owners to realise the importance and EE benefits of post commissioning.

Carry out up-to-date on-going post occupancy commissioning for all tenancy areas after fit-out changes are completed, if any.

a) Professional Engineer shall review all tenancy fit-out plans to ensure original design intent is not compromised and sign off the completed works.

1

b) CxS shall carry out re-commissioning of the building's energy related systems for the affected tenancy areas.

1

## EE8 EE Monitoring & Improvement

2

To make full use of installed EMS

Continuously monitor and improve energy use of key building services:-	
a) Use Energy Management System to monitor and trend log building system performance for HVAC system efficiency including parameters for plant sequencing, etc., AND	1
Monitor sub-metering of building systems to track energy consumption of major building uses and other end use applications e.g. by categorising into building systems or floors.	
b) Fully commission and activate Maximum Demand Limiting programme, AND	1
Compile, summarise and submit BEI, Fuel and Water Consumption of the building to GBI on an annual basis during the 3-years validity period or earlier whenever requested by GBI. Submissions shall include monthly energy and water bills.	

## EE9 Sustainable Maintenance

3

Address the 1st Class installation 3rd Class maintenance mentality.

Ensure the building's energy related systems will continue to perform as intended with proper and sustainable maintenance:-

a) At least 75% of permanent building maintenance team to participate in the commissioning of all building energy services.

1

b) Provide for a designated building maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage,

1

c) Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).

1



## 2) Indoor Environmental Quality

21 pts

<b><i>Air Quality</i></b>	
EQ1 Minimum IAQ Performance	<b>1</b>
EQ2 Environmental Tobacco Control	<b>1</b>
EQ3 Carbon Dioxide Monitoring & Control	<b>1</b>
EQ4 Indoor Air Pollutants	<b>2</b>
EQ5 Mould Prevention	<b>1</b>
<b><i>Thermal Comfort</i></b>	
EQ6 Thermal Comfort Control	<b>2</b>
EQ7 Air Change Effectiveness	<b>1</b>

## ***Lighting, Visual & Acoustic Comfort***

EQ8 Daylighting	<b>2</b>
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EQ9 Daylight Glare Control	<b>1</b>
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EQ10 Electric Lighting Levels	<b>1</b>
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EQ11 High Frequency Ballasts	<b>1</b>
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EQ12 External Views	<b>2</b>
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EQ13 Internal Noise Levels	<b>1</b>
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### ***Verification***

EQ14 IAQ Before/During Occupancy	<b>2</b>
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EQ15 Occupancy Comfort Survey	<b>2</b>
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## EQ2 Environmental Tobacco Control

1

Discourage smoking.

Minimize exposure of building occupants, indoor surfaces, and ventilation air distribution systems to Environmental Tobacco Smoke (ETS):-

a) Prohibit smoking in the building and locate any exterior designated smoking areas away from entries, outdoor air intakes and operable windows OR

b) Prohibit smoking in the building except in designated smoking rooms and establish negative pressure in the smoking rooms together with provision of effective air filtration system.

1

### 3. Sustainable Site Planning & Management

10 pts

<b><i>Facility Management</i></b>	
SM1 GBI Rated Design & Construction	<b>1</b>
SM2 Building Exterior Management	<b>1</b>
SM3 Integrated Pest Management, Erosion Control & Landscape Mgt	<b>1</b>
<b><i>Transportation</i></b>	
SM4 Green Vehicle Priority	<b>1</b>
SM5 Parking Capacity	<b>1</b>
<b><i>Reduce Heat Island Effect</i></b>	
SM6 Greenery & Roof	<b>4</b>
SM7 Building User Manual	<b>1</b>

## **SM1 GBI Rated Design & Construction**

**1**

To acknowledge and reward buildings with on-going Green and/or EE programs

If the building has been previously GBI (or other GBI approved Green Rating system) rated under any category, OR within the last 12 months a comprehensive Energy Efficiency Audit has been conducted.

**1**

## SM2 Building Exterior Management

1

Employ environmentally sensitive building exterior management plan to reduce pollution.

Use environmentally non-polluting methods and chemicals for cleaning of building exterior including maintenance equipment, chemicals, paint and sealants.

1

## SM3 Integrated Pest Management, Erosion Control & Landscape Mgt

1

Employ environmentally sensitive management to preserve the site's natural components. Minimise harmful chemical use, energy waste, water waste, air pollution, solid waste and/or chemical runoff such as gasoline and oil. The following operational elements must be addressed:

a) Use of least toxic chemical pesticides, minimum use of chemicals and use only in targeted locations and only for targeted species. Conduct routine inspection and monitoring AND

b) Erosion and sedimentation control for ongoing landscape operations including measures that prevent erosion and sedimentation, prevent air pollution from dust or particulate matter and restore eroded areas.

1

## 4) Materials & Resources

9 pts

<b><i>Reused &amp; Recycled Materials</i></b>	
MR1 Material reuse and selection	1
MR2 Recycled Content Materials	1
<b><i>Sustainable Materials &amp; Resources and Policy</i></b>	
MR3 Sustainable Timber	1
MR4 Sustainable Purchasing Policy	1
<b><i>Waste Management</i></b>	
MR5 Storage, Collection & Disposal of Recyclables	3
<b><i>Green Products</i></b>	
MR6 Refrigerants & Clean Agents	2



## MR1 Material reuse and selection

1

Reuse building materials and products to reduce demand for virgin materials and reduce creation of waste. This serves to reduce environmental impact associated with extraction and processing of virgin resources. Integrate building design and its buildability with selection of reused building materials, taking into account their embodied energy, durability, carbon content and life cycle costs:-

Where reused products/materials constitutes  $\geq 20\%$  of the project's total retrofit material cost value

1

## MR2 Recycled Content Materials

1

Increase demand for building products that incorporate recycled content materials in their production:- (Recycled content shall be defined in accordance with the International Organization of Standards Document)

Where use of materials with recycled content is such that the sum of post-consumer recycled plus one-half of the pre-consumer content constitutes > 20% (based on cost) of project's total retrofit material cost value.

1

## MR3 Sustainable Timber

1

Promote responsible forest management.

Encourage environmentally responsible forest management:-

Where > 75% of wood-based materials and products used in the retrofit works are certified. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. To include wood materials permanently installed and also temporarily purchased for the project. Compliant with Forest Stewardship Council AND Malaysian Timber Certification Council requirements.

1

## MR4 Sustainable Purchasing Policy

1

Promote responsible management culture.

Develop a Sustainable Purchasing policy that must cover product purchases within the building and management's control.

1

## MR5 Storage, Collection & Disposal of Recyclables

3

Facilitate reduction of waste generated during retrofit construction and during building occupancy that is hauled and disposed of in landfills:

Provide recycling facilities/infrastructure for sorting and separate collection of recyclable waste for recycling (consumables - glass, paper, metal, equipment, addition & alteration construction wastes)

1

Promote and encourage waste minimization and recycling among occupants, tenants and visitors through various avenues

1

Promote waste sorting, collecting, quantifying, monitoring and recycling of a large range of waste generated in-house.

1

## 5) Water Efficiency

12 points

<b><i>Water Harvesting &amp; Recycling</i></b>	
WE1 Rainwater Harvesting	<b>3</b>
WE2 Water Recycling	<b>2</b>
<b><i>Increased Efficiency</i></b>	
WE3 Water Efficient Irrigation/ Landscaping	<b>2</b>
WE4 Water Efficient Fittings	<b>3</b>
WE5 Metering and Leak Detection System	<b>2</b>

## WE1 Rainwater Harvesting

3

### Promote Rainwater Harvesting

Encourage rainwater harvesting that will lead to reduction in potable water consumption:-

Rainwater harvesting that leads to  $\geq 5\%$  reduction in potable water consumption, OR

1

Rainwater harvesting that leads to  $\geq 15\%$  reduction in potable water consumption, OR

2

Rainwater harvesting that leads to  $\geq 30\%$  reduction in potable water consumption

3

## WE4 Water Efficient Fittings

3

Minimise wastage of energy intensive treated water.

Encourage reduction in potable water consumption through use of efficient devices:-

I) With reference to Utility calculations;

a) Reduce annual potable water consumption by  $\geq 20\%$ , OR

1

b) Reduce annual potable water consumption by  $\geq 30\%$ , OR

2

c) Reduce annual potable water consumption by  $\geq 50\%$ , OR

3



## WE4 Water Efficient Fittings

3

II) From existing 3-year average water consumption record, reduce annual potable water use by:

a) by  $\geq 20\%$ , OR

1

b) by  $\geq 30\%$ , OR

2

c) by  $\geq 50\%$

3

## 6) Innovation

10 points

IN1	Innovation Environmental Initiatives	9
IN2	Green Building Index Facilitator	1

# IN1 Innovation in Design & Environment Design Initiatives

9

## Reward innovation and initiatives

Provide Existing Buildings the opportunity to be awarded points for exceptional performance above the requirements set by GBI rating system:-

1 point for each approved innovation and environmental design initiative up to a maximum of 9 points, such as;

Use of Integrated Building System (IBS)  $\geq$  30% of relevant retrofitted materials

Condensate water recovery (accounting for at least 50% of total AHUs/FCUs) for use as cooling tower make-up water etc;

Car park mechanical ventilation fans provided with VSD and controlled by CO<sub>2</sub>/CO sensors.

<b>POINTS</b>	<b>GBI RATING</b>	<b>INFERENCE</b>
<b>50 to 65</b>	<b>GBI CERTIFIED</b>	Good Practice
<b>66 to 75</b>	<b>GBI SILVER</b>	Excellent Practice
<b>76 to 85</b>	<b>GBI GOLD</b>	National Excellence
<b>86 +</b>	<b>GBI PLATINUM</b>	Global Excellence

# THANK YOU

[www.greenbuildingindex.org](http://www.greenbuildingindex.org)

