Registers and accreditates buildings  Promotes issues on green buildings
Our Climate
Our Resources
Our Priorities
List of green building rating tools

Below is a list of rating tools (in alphabetical order) that are administered by our Green Building Councils. This is not a comprehensive list, as there are a number of green building rating tools and certifications that exist but are not administered by a World Green Building Council member Green Building Council.

ARZ rating system
BERDE
BREEAM-NOR
Casa (Colombia)
CEDBIK-Konut Green building certification system
EDGE
Greenship
Green Key
Green Star
GBC Home
GBC Quartieri
Green Star SA
GRESB
HQE

BEAM Plus
BREEAM-LV
BREEAM
CASBEE
DGNB System
GBC Brasil CASA
Green Building Index
GreenSL
Homestar
GBC Historic Building
GBC Condomini
Green Star SA Kenya
Home Performance Index
ICP
VERIFICATION PARTNERS

Our trusted, independent verification partners ensure the credibility of the MyHIAU programme. Only products and services accredited by these verification bodies are eligible to register for the MyHIAU Mark and be listed on the MyHIAU Directory.

Our basis for the selection of independent verification partners is that the verifier must have the skills, experience and resources to assess, monitor and audit the certified products and services to ensure they genuinely comply with environmentally-friendly standards. We are constantly working with new verification bodies to grow our pool of partners, making the MyHIAU programme the most comprehensive green recognition programme throughout Malaysia.

| Verification Body  | GBI Rating System Tools | Ir. Chen Thiam Leong  
GBIAP Co-Chairman  
Tel: +6012 – 2159 813 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Building Index Sdn. Bhd.</td>
<td><img src="image" alt="GBI Rating System Tools" /></td>
<td></td>
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</table>
### Executive Summary as of 15 SEPTEMBER 2018

<table>
<thead>
<tr>
<th>STAGE</th>
<th>TOTAL AS OF 15 SEPTEMBER 2018</th>
<th>NRNC NON RESIDENTIAL NEW CONSTRUCTION</th>
<th>RNC RESIDENTIAL NEW CONSTRUCTION</th>
<th>INC INDUSTRIAL NEW CONSTRUCTION</th>
<th>NREB NON RESIDENTIAL EXISTING BUILDING</th>
<th>IEB INDUSTRIAL EXISTING BUILDING</th>
<th>ID INTERIOR</th>
<th>T TOWNSHIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied</td>
<td>909</td>
<td>492</td>
<td>322</td>
<td>36</td>
<td>27</td>
<td>6</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Registered</td>
<td>844</td>
<td>454</td>
<td>305</td>
<td>31</td>
<td>24</td>
<td>5</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>Total Certified</td>
<td>460 (100%)</td>
<td>235 (51%)</td>
<td>185 (40%)</td>
<td>12 (2%)</td>
<td>13 (3%)</td>
<td>3 (1%)</td>
<td>1 (1%)</td>
<td>11 (2%)</td>
</tr>
<tr>
<td>Provisional Certification DA</td>
<td>338</td>
<td>180</td>
<td>133</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>-</td>
<td>11</td>
</tr>
<tr>
<td>Final Certification CVA</td>
<td>107</td>
<td>45</td>
<td>52</td>
<td>2</td>
<td>5</td>
<td>2</td>
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<tr>
<td>Renewal Certification RVA</td>
<td>15</td>
<td>10</td>
<td>-</td>
<td>3</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
### Gross Floor Area (GFA) of GBI Rated Buildings

<table>
<thead>
<tr>
<th></th>
<th>Total As of 15 September 2018</th>
<th>NRNC Non Residential New Construction</th>
<th>RNC Residential New Construction</th>
<th>NREB Non Residential Existing Building</th>
<th>INC Industrial New Construction</th>
<th>IEB Industrial Existing Building</th>
<th>ID Interior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Floor Area, sqm (As Submitted)</td>
<td>20.1 million (215.9 million sqft)</td>
<td>8.4 million (41.96%)</td>
<td>10.3 million (51.49%)</td>
<td>954,120.49 (4.76%)</td>
<td>331,051.88 (1.65%)</td>
<td>28,520.12 (0.14%)</td>
<td>111.48 (0.01%)</td>
</tr>
</tbody>
</table>

### Carbon Dioxide (CO₂) Emission Reduction of GBI Rated Buildings

<table>
<thead>
<tr>
<th>CO₂ Reduction Projection</th>
<th>Total As of 15 September 2018</th>
<th>NRNC Non Residential New Construction</th>
<th>RNC Residential New Construction</th>
<th>NREB Non Residential Existing Building</th>
<th>INC Industrial New Construction</th>
<th>IEB Industrial Existing Building</th>
<th>ID Interior</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ Emission Reduction (ktCO₂e/annum, based on electricity energy reduction only) @ 1 kWh = 0.694 kg CO₂ - Peninsular 0.699 kg CO₂ - Sarawak 0.536 kg CO₂ - Sabah</td>
<td>973</td>
<td>633 (65.06%)</td>
<td>248 (25.53%)</td>
<td>76 (7.85%)</td>
<td>13 (1.31%)</td>
<td>2 (0.24%)</td>
<td>1 (0.01%)</td>
</tr>
</tbody>
</table>
High-Efficiency Insulation for Cooler Building

Ar Michael Ching
GREEN BUILDING INDEX RATING SYSTEM

BUILDINGS WILL BE AWARDED THE GBI RATING BASED ON 6 KEY CRITERIA:

1 ENERGY EFFICIENCY
2 INDOOR ENVIRONMENTAL QUALITY
3 SUSTAINABLE SITE PLANNING AND MANAGEMENT
4 MATERIAL AND RESOURCES
5 WATER EFFICIENCY
6 INNOVATION

ENERGY EFFICIENCY (EE)
Improve energy consumption by optimising building orientation, minimizing solar heat gain through the building envelope, harvesting natural lighting, adopting the best practices in building services including use of renewable energy, and ensuring proper testing, commissioning and regular maintenance.

INDOOR ENVIRONMENT QUALITY (EQ)
Achieve good quality performance in indoor air quality, acoustics, visual and thermal comfort. These will involve the use of low volatile organic compound materials, application of quality air filtration, proper control of air temperature, movement and humidity.

SUSTAINABLE SITE PLANNING (SM)
Selecting appropriate sites with planned access to public transportation, community services, open spaces and landscaping. Avoiding and conserving environmentally sensitive areas through the redevelopment of existing sites and brownfields. Implementing proper construction management, storm water management and reducing the strain on existing infrastructure capacity.

MATERIALS & RESOURCES (MR)
Promote the use of environment-friendly materials sourced from sustainable sources and recycling. Implement proper construction waste management with storage, collection and re-use of recyclables and construction formwork and waste.

WATER EFFICIENCY (WE)
Rainwater harvesting, water recycling and water-saving fittings.

INNOVATION (IN)
Innovative design and initiatives that meet the objectives of the GBI.
- GBI Non-Residential New Construction (NRNC) Tool [PDF]
- GBI Residential New Construction (RNC) Tool V1.0 [PDF]
- GBI Residential New Construction (RNC) Tool V2.0 [PDF]
- GBI Residential New Construction (RNC) Tool V3.0 [PDF]
- GBI Non-Residential Existing Building (NREB) Tool [PDF]
- GBI NRNC: Data Centre Tool V1.0 [PDF]
- GBI NREB: Data Centre Tool V1.0 [PDF]
- GBI NRNC: Retail Tool V1.0 [PDF]
- GBI NREB: Retail Tool V1.0 [PDF]
- GBI Non-Residential New Construction (NRNC): Hotel Tool V1.0 [PDF]
- GBI Non-Residential Existing Building (NREB): Hotel Tool V1.0 [PDF]
- GBI Non-Residential New Construction (NRNC): Resort Tool V1.0 [PDF]
- GBI Non-Residential Existing Building (NREB): Resort Tool V1.0 [PDF]
- GBI Township Tool Version 1.01 [PDF]
- GBI Industrial New Construction (INC) Tool V1.0 [PDF]
- GBI Industrial Existing Building (IEB) Tool V1.0 [PDF]
- GBI Interiors (ID) Tool V1.0 [PDF]
- GBI Non-Residential New Construction (NRNC): Hospital Tool V1.0 [PDF]
- GBI Non-Residential Existing Building (NREB): Hospital Tool V1.0 [PDF]
- GBI Township Tool Version 2.0 [PDF] *NEW*
- GBI Non-Residential Existing Building (NREB): Historic Building Tool V1.0 [PDF] *NEW*
### Advanced EE Performance

Establish EE Performance to reduce dependence on energy to keep indoor environment at satisfactory comfort level. Computed OTTV and Roof U-value to show lower dependence on energy to maintain indoor thermal comfort.

#### A) Landed

- OTTV ≤ 46 W/m², **OR**
- OTTV ≤ 42 W/m², **OR**
- OTTV ≤ 38 W/m²
- Lightweight Roof **U-value ≤ 0.35 W/m²K** / Heavyweight Roof **U-value ≤ 0.50 W/m²K**, **OR**
  - Lightweight Roof **U-value ≤ 0.30 W/m²K / Heavyweight Roof U-value ≤ 0.40 W/m²K**, **OR**
  - Lightweight Roof **U-value ≤ 0.25 W/m²K / Heavyweight Roof U-value ≤ 0.30 W/m²K**, **OR**
  - Lightweight Roof **U-value ≤ 0.20 W/m²K / Heavyweight Roof U-value ≤ 0.20 W/m²K**, **OR**
  - Lightweight Roof **U-value ≤ 0.15 W/m²K / Heavyweight Roof U-value ≤ 0.15 W/m²K**.

#### B) Low-rise

- OTTV ≤ 46 W/m², **OR**
- OTTV ≤ 42 W/m², **OR**
- OTTV ≤ 38 W/m², **OR**
- OTTV ≤ 34 W/m², **OR**
- OTTV ≤ 30 W/m²
- Lightweight Roof **U-value ≤ 0.35 W/m²K / Heavyweight Roof U-value ≤ 0.50 W/m²K**, **OR**
  - Lightweight Roof **U-value ≤ 0.30 W/m²K / Heavyweight Roof U-value ≤ 0.40 W/m²K**, **OR**
  - Lightweight Roof **U-value ≤ 0.25 W/m²K / Heavyweight Roof U-value ≤ 0.30 W/m²K**, **OR**
  - Lightweight Roof **U-value ≤ 0.20 W/m²K / Heavyweight Roof U-value ≤ 0.20 W/m²K**, **OR**
  - Lightweight Roof **U-value ≤ 0.15 W/m²K / Heavyweight Roof U-value ≤ 0.15 W/m²K**.

#### C) High-rise

- OTTV ≤ 46 W/m², **OR**
- OTTV ≤ 42 W/m², **OR**
- OTTV ≤ 38 W/m², **OR**
- OTTV ≤ 34 W/m², **OR**
- OTTV ≤ 30 W/m²
- Lightweight Roof **U-value ≤ 0.35 W/m²K / Heavyweight Roof U-value ≤ 0.30 W/m²K**, **OR**
  - Lightweight Roof **U-value ≤ 0.30 W/m²K / Heavyweight Roof U-value ≤ 0.40 W/m²K**, **OR**
  - Lightweight Roof **U-value ≤ 0.25 W/m²K / Heavyweight Roof U-value ≤ 0.30 W/m²K**, **OR**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTTV ≤ 46 W/m²</td>
<td><strong>OR</strong></td>
<td>1</td>
</tr>
<tr>
<td>OTTV ≤ 42 W/m²</td>
<td><strong>OR</strong></td>
<td>2</td>
</tr>
<tr>
<td>OTTV ≤ 38 W/m²</td>
<td><strong>OR</strong></td>
<td>3</td>
</tr>
<tr>
<td>Lightweight Roof</td>
<td><strong>U-value ≤ 0.35 W/m²K / Heavyweight Roof U-value ≤ 0.50 W/m²K</strong>, <strong>OR</strong></td>
<td>1</td>
</tr>
<tr>
<td>Lightweight Roof</td>
<td><strong>U-value ≤ 0.30 W/m²K / Heavyweight Roof U-value ≤ 0.40 W/m²K</strong>, <strong>OR</strong></td>
<td>2</td>
</tr>
<tr>
<td>Lightweight Roof</td>
<td><strong>U-value ≤ 0.25 W/m²K / Heavyweight Roof U-value ≤ 0.30 W/m²K</strong>, <strong>OR</strong></td>
<td>3</td>
</tr>
<tr>
<td>Lightweight Roof</td>
<td><strong>U-value ≤ 0.20 W/m²K / Heavyweight Roof U-value ≤ 0.20 W/m²K</strong>, <strong>OR</strong></td>
<td>6</td>
</tr>
<tr>
<td>Lightweight Roof</td>
<td><strong>U-value ≤ 0.15 W/m²K / Heavyweight Roof U-value ≤ 0.15 W/m²K</strong></td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>Value</th>
<th>Count</th>
</tr>
</thead>
<tbody>
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<td><strong>OR</strong></td>
<td>1</td>
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<td><strong>OR</strong></td>
<td>2</td>
</tr>
<tr>
<td>OTTV ≤ 38 W/m²</td>
<td><strong>OR</strong></td>
<td>3</td>
</tr>
<tr>
<td>OTTV ≤ 34 W/m²</td>
<td><strong>OR</strong></td>
<td>4</td>
</tr>
<tr>
<td>OTTV ≤ 30 W/m²</td>
<td><strong>OR</strong></td>
<td>6</td>
</tr>
<tr>
<td>Lightweight Roof</td>
<td><strong>U-value ≤ 0.35 W/m²K / Heavyweight Roof U-value ≤ 0.50 W/m²K</strong>, <strong>OR</strong></td>
<td>1</td>
</tr>
<tr>
<td>Lightweight Roof</td>
<td><strong>U-value ≤ 0.30 W/m²K / Heavyweight Roof U-value ≤ 0.40 W/m²K</strong>, <strong>OR</strong></td>
<td>2</td>
</tr>
<tr>
<td>Lightweight Roof</td>
<td><strong>U-value ≤ 0.25 W/m²K / Heavyweight Roof U-value ≤ 0.30 W/m²K</strong>, <strong>OR</strong></td>
<td>3</td>
</tr>
<tr>
<td>Lightweight Roof</td>
<td><strong>U-value ≤ 0.20 W/m²K / Heavyweight Roof U-value ≤ 0.20 W/m²K</strong>, <strong>OR</strong></td>
<td>6</td>
</tr>
<tr>
<td>Lightweight Roof</td>
<td><strong>U-value ≤ 0.15 W/m²K / Heavyweight Roof U-value ≤ 0.15 W/m²K</strong></td>
<td>9</td>
</tr>
</tbody>
</table>
(1) New or renovated non-residential buildings with air-conditioned space exceeding 4,000 square metres shall be –

a) designed to meet the requirements of MS 1525 with regards to the Overall Thermal Transfer Value (OTTV) and the Roof Thermal Transfer Value (RTTV); and

b) provided with an Energy Management System.
UBBL Clause 38A

Amendment 2012
Energy efficiency in buildings

“non-residential” includes industrial, institutional, commercial, retail
“air-conditioned” means buildings with centralised aircond system
“exceeding 4,000 sm” excludes shophouses or small non-residential buildings even though centralised aircond is employed.
(2) The roof for all buildings (residential and non residential) shall not have a thermal transmittance (U-value) greater than—

a) 0.4 W/m²K for Light (under 50 kg/m²) weight roof;

b) 0.6 W/m²K for Heavy (above 50 kg/m²) weight roof, unless provided with other shading or cooling means.
Roof U-Value Calculation

- PRIMARY ROOF

- Mechanical plant, equipment (including PV) and water tank, which exposed to the sky, the Roof U-value are calculated on the Primary Roof construction
### Roof U-Value Calculation

#### PRIMARY ROOF

<table>
<thead>
<tr>
<th>Primary Roof</th>
<th>Roof U-value applies here</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitable space, Res, Non-Res, AC, Non-AC</td>
<td></td>
</tr>
</tbody>
</table>

Section
Roof U-Value Calculation

- PRIMARY ROOF - EXEMPTION
  - Exempt from Roof U-value calculation if there is a Secondary Roof like horizontal pergolas or screens can be used to be part of the calculation to reduce Urban Heat Island (UHI)
Roof U-Value Calculation

- PRIMARY & SECONDARY ROOF

Plan

- Tile
- Cement
- Timber
- Landscape
- Pool
Roof U-Value Calculation

- PRIMARY & SECONDARY ROOF
Roof Insulation

- GENERALY 2 TYPES
  - Mass
  - Radiant Barrier
Roof U-Value for Radiant Barrier

- ENGAGEMENT WITH STAKE HOLDER
- Confusion on the Air Gap R-Value in the Industry
- On-going discussion with Reflective Insulation Manufacturers of Malaysia (RIMM)

FMM RIMM

- Input from Market Leading Manufactural
Roof U-Value for Radiant Barrier

- **ENGAGEMENT WITH STAKE HOLDER**
- Presentation from
  - San Migual Yamamura
  - Monier
  - Terreal
Roof U-Value for Radiant Barrier

- **GBI REQUIREMENT**
- The Testing Method for the Radiant Barrier Air Gap to follow MS 2095:2014 or an equivalent standard
Roof U-Value for Radiant Barrier

- **GBI REQUIREMENT**
- The Testing Method for the Radiant Barrier Air Gap to follow MS 2095:2014 or an equivalent standard
- Apply a Reduction Coefficient to Air Gap R-value, until an in-depth experiment is conducted to conclude the findings
5.6.2 Test method

The test method shall be as follows:

a) cut the appropriate size of 600 mm x 500 mm, and approximately 10 cm from the edge of the material roll of the specimen;

b) place the specimen on the wooden frame, then place the second frame on top of the test specimen, then, the test specimen shall be securely sandwiched between the two wooden frames;

c) the test specimen shall be installed with an air gap of 40 mm on the "hot" side and similarly, an air gap of 60 mm on the "cold" side, by mounting the sample on the wooden frame where the reflective surface is facing the hot side;

d) the temperature of hot and cool plate shall be 35°C and 20°C, with the temperature difference of 15°C;

e) the sample thickness used in calculating the equivalent thermal resistance of the sample is not the actual thickness of the foil sample, but (100 ± 10) mm, being the actual thickness of the test system. Calculate the system thermal resistance for this combination of test specimen and air gaps, using the equations given in the relevant test methods; and

f) the reported values for thermal resistance shall be the equivalent thermal resistance values (in m²K/W) for a system, consisting of a sample of reflective foil mounted between the two plates of the apparatus with specified air gaps, not for the foil sample in isolation.

6 Recommended usage

6.1 General

A radiant barrier and reflective insulation building materials shall be allowed for use according to its classifications. In each application, the intended functions (as defined in 5.1 to 5.6) shall be determined to enable selection of the allowable classifications.

6.2 Duty

When a radiant barrier and reflective insulation building materials are installed, its duty classification shall be as specified in Table 3.
Roof U-Value for Radiant Barrier

- **GBI REQUIREMENT**
- Apply a **20%** Reduction Coefficient to Air Gap R-value, due to:-
  - Angle of Roof Slope
  - Varies Dimension of Air Gap above and below the Radiant Barrier
  - The condition of the Site, viz cleanliness
Roof U-Value for Radiant Barrier

- Example of Calculation
<table>
<thead>
<tr>
<th>Clause</th>
<th>Specification / Requirements</th>
<th>Results</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3</td>
<td>Emittance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Reflective: at least one of its faces has an emittance of not greater than 0.06</td>
<td>0.02</td>
<td>Type a: Reflective</td>
</tr>
<tr>
<td></td>
<td>b) Value: can be classify as value if the emittance within 0.06 to 0.59</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Non Reflective: For the material that was not classified as reflective or as a value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.6</td>
<td>Thermal Resistance</td>
<td>1.97 m²K/W</td>
<td>No Requirement</td>
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</tbody>
</table>

(The remainder of this page is intentionally left blank)
### Roof U-Value for Radiant Barrier

<table>
<thead>
<tr>
<th>Item</th>
<th>Original R-Value</th>
<th>Revised R-Value (Reduction Air Gap of 20%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Surface Resistance</td>
<td>0.040</td>
<td>0.040</td>
</tr>
<tr>
<td>Clay Tile Roof</td>
<td>0.020</td>
<td>0.020</td>
</tr>
<tr>
<td>Insulation &amp; Air Gap</td>
<td>1.970</td>
<td>1.576</td>
</tr>
<tr>
<td>Attic</td>
<td>0.650</td>
<td>0.650</td>
</tr>
<tr>
<td>Plaster Ceiling</td>
<td>0.056</td>
<td>0.056</td>
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<tr>
<td>Internal Surface Resistance</td>
<td>0.160</td>
<td>0.160</td>
</tr>
<tr>
<td>Total R Value</td>
<td>2.896</td>
<td>2.502</td>
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</table>

**U Value (1/R)**

<table>
<thead>
<tr>
<th></th>
<th>Original U Value</th>
<th>Revised U Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.345</td>
<td>0.400</td>
</tr>
</tbody>
</table>
THANK YOU