

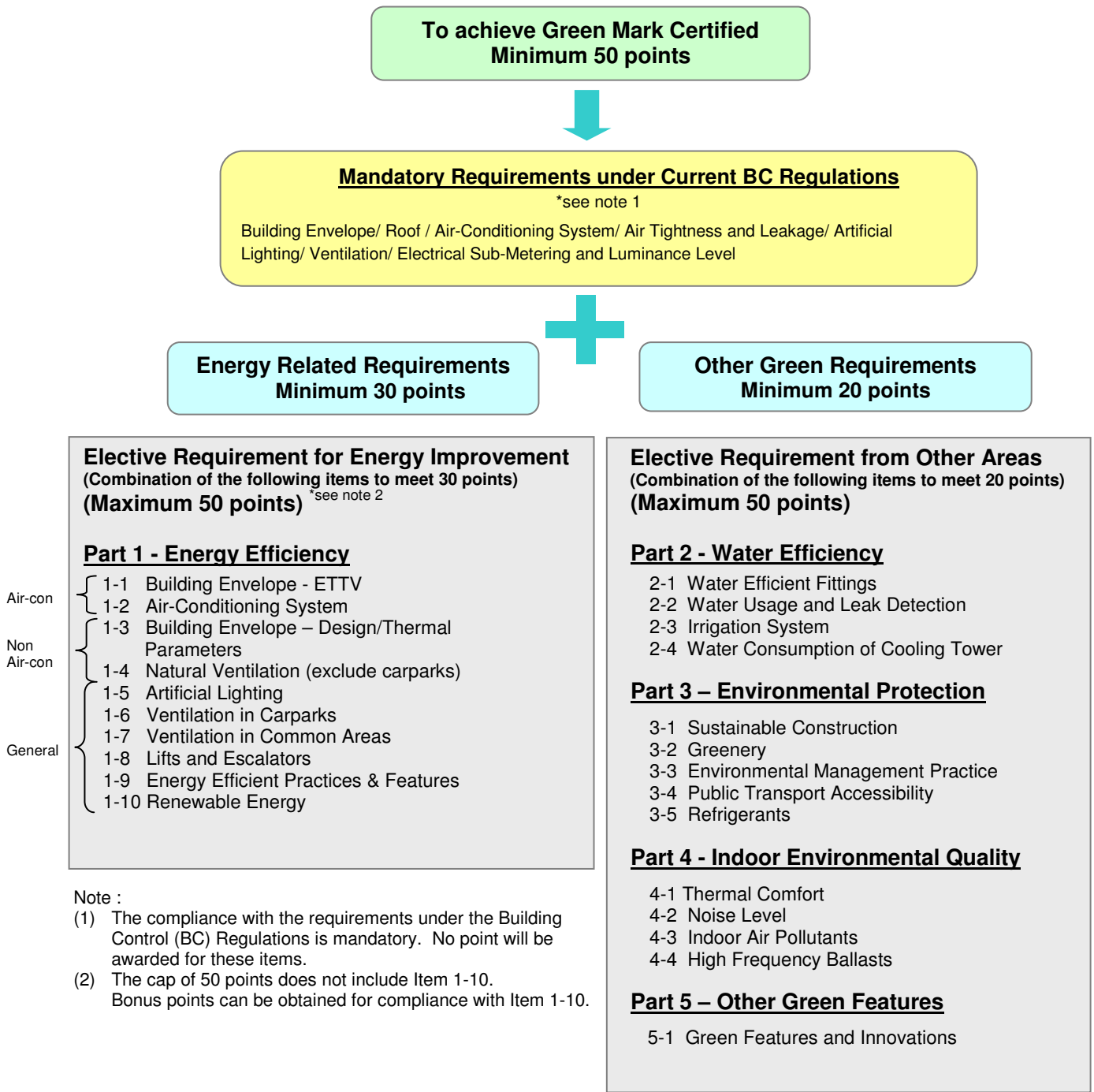


BCA GREEN MARK

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**BCA Green Mark for Non-Residential Building  
Version NRB/3.0**

## Framework - BCA Green Mark for Non-Residential Buildings (Version NRB/3.0)



**Point Allocations - BCA Green Mark for Non-Residential Buildings (Version NRB/3.0)**

Category			Point Allocations	
<b>(I) Energy Related Requirements</b>				
Maximum Cap of 50 points	Minimum 30 points	<b>Part 1 : Energy Efficiency</b>		
		1-1 Building Envelope – ETTV	Section (A) Applicable to air-con areas	15
		1-2 Air-Conditioning System		27
		<b>Sub-Total (A) - Item 1-1 to 1-2</b>		<b>42</b>
		1-3 Building Envelope - Design/Thermal Parameters	Section (B) Applicable to non air-con areas	29
		1-4 Natural Ventilation (exclude carparks)		13
		<b>Sub-Total (B) - Item 1-3 to 1-4</b>		<b>42</b>
		1-5 Artificial Lighting	Section (C) Generally applicable to all areas	12
		1-6 Ventilation in Carparks		5
		1-7 Ventilation in Common Areas		5
1-8 Lifts and Escalators	3			
1-9 Energy Efficient Practices & Features		12		
<b>Sub-Total (C) - Item 1-5 to 1-9</b>		<b>37</b>		
<b>Category Score for Part 1 – Energy Efficiency (Exclude Bonus Points)</b>		<b>79</b>		
<b>Prorate Subtotal (A) + Prorate Subtotal (B) + Subtotal (C)</b>				
Bonus 20 points		1-10 Renewable Energy ( <i>Bonus Points</i> )	20	
<b>(II) Other Green Requirements</b>				
Maximum Cap of 50 points	Minimum 20 points	<b>Part 2 : Water Efficiency</b>		
		2-1 Water Efficient Fittings		8
		2-2 Water Usage and Leak Detection		2
		2-3 Irrigation System		2
		2-4 Water Consumption of Cooling Tower		2
		<b>Category Score for Part 2 – Water Efficiency</b>		<b>14</b>
		<b>Part 3 : Environmental Protection</b>		
		3-1 Sustainable Construction		14
		3-2 Greenery		6
		3-3 Environmental Management Practice		8
		3-4 Public Transport Accessibility		2
		3-5 Refrigerants		2
		<b>Category Score for Part 3 – Environmental Protection</b>		<b>32</b>
		<b>Part 4 : Indoor Environmental Quality</b>		
		4-1 Thermal Comfort		2
		4-2 Noise Level		2
		4-3 Indoor Air Pollutants		2
4-4 High Frequency Ballasts		2		
<b>Category Score for Part 4 – Indoor Environmental Quality</b>		<b>8</b>		
<b>Part 5 : Other Green Features</b>				
5-1 Green Features & Innovations		7		
<b>Category Score for Part 5 – Other Green Features</b>		<b>7</b>		
<b>Total Points Allocated :</b>			<b>140</b>	
<b>Total Point Allocated (Include BONUS points):</b>			<b>160</b>	
<b>Green Mark Score (Max) :</b>			<b>100 + Bonus 20 points</b>	

### BCA Green Mark Award Rating

Green Mark Score	Green Mark Rating
90 and above	Green Mark Platinum
85 to < 90	Green Mark Gold <sup>Plus</sup>
75 to < 85	Green Mark Gold
50 to < 75	Green Mark Certified

### Pre-requisite Requirements for BCA Green Mark Gold<sup>Plus</sup> and Platinum Rating

- Air-Conditioned Buildings

To demonstrate the stipulated energy savings over its reference model using energy modelling framework set out by BCA. Details and submission requirements on energy modelling can be found in the BCA website at <http://www.bca.gov.sg/GreenMark/gmis.html>.

Projects should achieve:

- At least 25 % energy savings to qualify for Green Mark Gold<sup>Plus</sup> rating
- At least 30 % energy savings to qualify for Green Mark Platinum rating

- Non Air-Conditioned Buildings

Use of ventilation simulation software or wind tunnel testing to identify the most effective building design and layout and has implemented the recommendations derived to ensure good natural ventilation.

## BCA Green Mark for Non-Residential Buildings (Version NRB/3.0) Mandatory Requirements

### **M1 Building Envelope – ETTV**

The envelope thermal transfer value (ETTV) of the building, as determined in accordance with the formula set out in the “Code on Envelope Thermal Performance for Buildings” issued by the Commissioner of Building Control, shall not exceed 50 W/m<sup>2</sup>.

### **M2 Roof – RTTV**

In respect of roofs with skylight, the roof thermal transfer value (RTTV) as determined in accordance with the formula set out in the “Code on Envelope Thermal Performance for Buildings” issued by the Commissioner of Building Control, shall not exceed 50 W/m<sup>2</sup>.

### **M3 Roof – U Value**

In respect of roofs without skylight, the average thermal transmittance (U-value) for the gross area of the roof shall not exceed the limit prescribed in the following Table 3-1 and Table 3-2 for the corresponding weight group.

Table 3-1 – Maximum Thermal Transmittance for Roof of Air-Conditioned Building

Weight Group	Weight range (kg/m <sup>2</sup> )	Maximum Thermal Transmittance (W/m <sup>2</sup> K)
Light	Under 50	0.5
Medium	50 to 230	0.8
Heavy	Over 230	1.2

Table 3-2 – Maximum Thermal Transmittance for Roof of Non Air-Conditioned Building

Weight Group	Weight range (kg/m <sup>2</sup> )	Maximum Thermal Transmittance (W/m <sup>2</sup> K)
Light	Under 50	0.8
Medium	50 to 230	1.1
Heavy	Over 230	1.5

This requirement does not apply to building with an aggregate floor area not exceeding 500 m<sup>2</sup>, open sided sheds, covered walkways and linkways, store rooms and utility rooms or plants and equipment rooms.

### **M4 Air-Conditioning System**

(a) Where the cooling capacity of any air-conditioning system exceeds 30 kW, the equipment shall comply with the relevant provisions of SS 530 – Code of Practice for Energy Efficiency Standard for Building Services and Equipment.

(b) Air-conditioning system shall be equipped with manual switches, timers or automatic controllers for shutting off part of the air-conditioning system to reduce energy use whenever conditions permit.

(c) In any hotel building, control devices shall be installed in every guestroom such that the power to the air-conditioning required in a guestroom would automatically be turned off when the occupant is not in the room.

### **M5 Air Tightness and Leakage**

(a) All windows on the building envelope shall not exceed the air leakage rates specified in SS 212 – Specification for Aluminium Alloy Windows.

(b) Where the door opening of any commercial unit is located along the perimeter of the building envelope or leading to an exterior open space, external corridor, passageway or pedestrian walkway, that unit shall –

- (i) be completely separated from the other parts of the building; and
- (ii) has its air-conditioning system separated from and independent of the central system.

**M6 Artificial Lighting**

(a) The maximum lighting power budget in a building shall comply with SS 530 – Code of Practice for Energy Efficiency Standard for Building Services and Equipment.

(b) Lighting control for artificial lighting shall be provided in accordance with SS 530.

(c) In any hotel building, control devices shall be installed in every guestroom such that the power to the lights in a guestroom would automatically be turned off when the occupant is not in the room.

**M7 Ventilation**

Ventilation shall be adequately provided in a building for its intended occupancy.

(a) Where natural ventilation is applicable, it shall be provided by means of openable windows or other openings with an aggregate area of not less than –

- (i) 5% of the floor area of the room or space required to be ventilated; and
- (ii) 15% of the floor area of the aboveground car parking area required to be ventilated.

(b) Where mechanical ventilation or air-conditioning systems are used, the ventilation rates of these systems shall comply with SS CP 13 – Code of Practice for Mechanical Ventilation and Air-Conditioning in Buildings.

**M8 Electrical Sub-Metering**

Provision of sub-metering to monitor energy consumption of key building services and energy usage of end users or tenants.

**M9 Luminance Level**

Building lighting is maintained at luminance level as stated in SS CP 38 – Code of Practice for Artificial Lighting in Buildings for various types of occupancy and in SS 531:Part 1 : 2006 – Code of Practice for Lighting of Work Places where appropriate.

*Source: Building Control Regulations /Approved Document*

**Elective Requirements**

<b>Part 1 – Energy Efficiency</b>	<b>Green Mark Points</b>
<b>(A) Applicable to Air-Conditioned Building Areas (with an aggregate air-conditioned areas &gt; 500 m<sup>2</sup>)</b>	
<p><b><u>1-1 Building Envelope – ETTV</u></b></p> <p>Enhance the overall thermal performance of building envelope to minimise heat gain thus reducing the overall cooling load requirement.</p> <p><u>Baseline</u> : Maximum Permissible ETTV = 50 W/m<sup>2</sup></p>	<p>2 points for every reduction of 1 W/m<sup>2</sup> in ETTV from the baseline</p> <p>Points awarded = 100 – 2(ETTV) where ETTV ≤ 50 W/m<sup>2</sup> (Up to 15 points)</p>
<p><b><u>1-2 Air-Conditioning System</u></b></p> <p>Encourage the use of better efficient air-conditioned equipment to minimise energy consumption.</p> <p><u>Baseline</u> : Minimum efficiency requirement of the air-conditioning system stated in SS 530 &amp; SS CP 13.</p> <p>The systems to be considered are as follows -</p> <p>(a)(i) Air-Conditioned Plant :</p> <ul style="list-style-type: none"> <li>• Chiller</li> <li>• Chilled-water pump</li> <li>• Condenser water pump</li> <li>• Cooling tower</li> </ul> <p>(a)(ii) Air Distribution System :</p> <ul style="list-style-type: none"> <li>• Air Handling Units (AHUs)</li> <li>• Fan Coil Units (FCUs)</li> </ul> <p>Note (1) : For buildings using district cooling system, there is no need to compute the plant efficiency under item (a)(i). The points obtained will be pro-rated based on the air distribution system efficiency under item (a)(ii).</p> <p style="text-align: center;">OR</p> <p>(b) Unitary Air-Conditioners/Condensing Units :</p> <ul style="list-style-type: none"> <li>• Single-Split Unit</li> <li>• Multi-Split Unit</li> <li>• Variable Refrigerant Volume (VRV) System</li> </ul> <p>Note (2) : Where there is a combination of centralised air-con system with unitary air-conditioned system, the computation for the points awarded will only be based on the air-conditioning system with a larger aggregate capacity.</p> <p>(c) Sensors or similar automatic control devices are used to regulate outdoor air flow rate to maintain the concentration of carbon dioxide below 1000ppm</p>	<p><u>(a)(i) Air-Conditioned Plant</u></p> <p>1.45 points for every percentage improvement in the efficiency of chiller, chilled-water pump and condenser water pump. Points awarded = 1.45 x (% improvement)</p> <p>0.05 point for every percentage improvement in the performance required for cooling tower. Points awarded = 0.05 x (% improvement)</p> <p style="text-align: center;">(Up to 20 points)</p> <p><u>(a)(ii) Air Distribution System</u></p> <p>0.5 points for every percentage improvement in the air distribution system efficiency. Points awarded = 0.5 x (% improvement)</p> <p style="text-align: center;">(Up to 5 points)</p> <p style="text-align: center;">OR</p> <p><u>(b) Unitary Air-Conditioners/Condensing Units</u></p> <p>1.5 points for every percentage (average) improvement in the efficiency of all unitary air-conditioners/ condensing units. Points awarded = 1.5 x (% improvement)</p> <p style="text-align: center;">(Up to 25 points)</p> <p style="text-align: center;">2 points</p>
<b>Sub-Total (A) :</b>	Sum of Green Mark Points obtained from Item 1-1 to 1-2

Part 1 – Energy Efficiency	Green Mark Points												
<b>(B) Applicable to Non Air-Conditioned Building Areas (with an aggregate non air-conditioned areas &gt; 10 % of total floor area excluding carparks)</b>													
<p><b><u>1-3 Building Envelope – Design / Thermal Parameters</u></b></p> <p>Enhance the overall thermal performance of building envelope to minimise heat gain which would improve indoor thermal comfort and encourage natural ventilation.</p> <p>(a) Minimum direct west facing façade through building design orientation.</p> <p>Note (3) : Orientation of façade that falls within the range of 22.5° N of W and 22.5° S of W will be defined as west facing facade. Core walls for lifts or staircases and toilets that are located within this range are exempted in computation.</p> <p>(b)(i) Minimum west facing window openings.</p> <p>(b)(ii) Effective sunshading provision for windows on the west façade with minimum shading of 30%.</p> <p>(c) Better thermal transmittance (U-value) of external west facing walls. The U-value of external west facing walls should be equal or less than 2 W/m<sup>2</sup>K.</p> <p>(d) Better thermal transmittance (U-value) of roof. <u>Baseline</u>: U-value for roof stated below depending on the weight range of roof structure:</p> <table border="1" data-bbox="181 1680 688 1879"> <thead> <tr> <th>Weight Group</th> <th>Weight range (kg/m<sup>2</sup>)</th> <th>Maximum Thermal Transmittance (W/m<sup>2</sup>K)</th> </tr> </thead> <tbody> <tr> <td>Light</td> <td>Under 50</td> <td>0.8</td> </tr> <tr> <td>Medium</td> <td>50 to 230</td> <td>1.1</td> </tr> <tr> <td>Heavy</td> <td>Over 230</td> <td>1.5</td> </tr> </tbody> </table>	Weight Group	Weight range (kg/m <sup>2</sup> )	Maximum Thermal Transmittance (W/m <sup>2</sup> K)	Light	Under 50	0.8	Medium	50 to 230	1.1	Heavy	Over 230	1.5	<p>Points awarded = <math>10 - 0.2 \times (\% \text{ of west facing facade areas over total facade areas})</math></p> <p>(Up to 10 points)</p> <p>Where there is no west facing façade, the total points awarded for this item will be <u>24 points</u>; the items 1-3 b(i), b(ii) and (c) as listed below will not be applicable.</p> <p>Points awarded = <math>10 - 0.1 \times (\% \text{ of west facing window areas over total west facing facade areas})</math></p> <p>Points awarded = <math>0.1 \times (\% \text{ of west facing window areas with sunshading devices over total west facing facade areas})</math></p> <p>(Up to 10 points for item b(i) &amp; b(ii))</p> <p>Points awarded = <math>0.04 \times (\% \text{ of the external west facing walls areas with U value of } 2 \text{ W/m}^2\text{K or less over total west facing facades areas})</math></p> <p>(4 points)</p> <p>2 points for every 0.1 W/m<sup>2</sup>K reduction ( Up to 5 points)</p>
Weight Group	Weight range (kg/m <sup>2</sup> )	Maximum Thermal Transmittance (W/m <sup>2</sup> K)											
Light	Under 50	0.8											
Medium	50 to 230	1.1											
Heavy	Over 230	1.5											

Part 1 – Energy Efficiency	Green Mark Points
<b>(B) Applicable to Non Air-Conditioned Building Areas (with an aggregate non air-conditioned areas &gt; 10 % of total floor area excluding carparks)</b>	
<p><b><u>1-4 Natural Ventilation (exclude carparks)</u></b></p> <p>Enhance building design to achieve good natural ventilation.</p> <p>(a) Proper design of building layout that utilizes prevailing wind conditions to achieve adequate cross ventilation.</p> <p>(b) Use of ventilation simulation software or wind tunnel testing to identify the most effective building design and layout to achieve good natural ventilation.</p>	<p>0.8 point for every 10% of units/rooms with window openings facing north and south directions Points awarded = 0.8 x (% of units/10) (Up to 8 points)</p> <p>Points will only be awarded provided that the recommendations from ventilation simulations are implemented (5 points)</p>
<p><i>Exception : For existing buildings, Item 1.3(a) may be excluded in computation, the total Green Mark Points for Sub-Total (B) under Part 1 will be prorated accordingly.</i></p>	
<p style="text-align: right;"><b>Sub-Total (B) :</b></p>	<p style="text-align: center;">Sum of Green Mark Points obtained from Item 1-3 to 1-4</p>

Part 1 - Energy Efficiency	Green Mark Points
<b>(C) General</b>	
<p><b><u>1-5 Artificial Lighting</u></b></p> <p>Encourage the use of better efficient lighting to minimise energy consumption from lighting usage while maintaining proper lighting level.</p> <p><u>Baseline</u> = Maximum lighting power budget stated in SS 530</p>	<p>0.5 point for every percentage improvement in lighting power budget</p> <p>Points awarded = 0.5 x (% improvement)</p> <p>(Including tenant lighting provision) (Up to 12 points)</p> <p>(Excluding tenant lighting provision) (Up to 5 points)</p>
<p><b><u>1-6 Ventilation in Carparks</u></b></p> <p>Encourage the use of energy efficient design and control of ventilation systems in carparks.</p> <p>(a) Carparks designed with natural ventilation.</p> <p>(b) CO sensors are used to regulate the demand for mechanical ventilation (MV).</p> <p>Note (4) : Where there is a combination of different ventilation mode adopted for carpark design, the points obtained under this item will be prorated accordingly.</p>	<p>Naturally ventilated carparks – 5 points</p> <p>Points awarded based on the mode of mechanical ventilation provided</p> <p>Fume extract – 4 points</p> <p>MV with or without supply - 3 points</p> <p>(Up to 5 points)</p>
<p><b><u>1-7 Ventilation in Common Areas</u></b></p> <p>Encourage the use of energy efficient design and control of ventilation systems in the following common areas :</p> <p>(a) Toilets (b) Staircases (c) Corridors (d) Lift lobbies (e) Atriums</p>	<p>Extent of Coverage : At least 90 % of each applicable area</p> <p>Points awarded based on the mode of ventilation provided in the applicable areas</p> <p>Natural ventilation – 1.5 points for each area</p> <p>Mechanical ventilation – 0.5 point for each area</p> <p>(Up to 5 points)</p>
<p><b><u>1-8 Lifts and Escalators</u></b></p> <p>Encourage the use of efficient lifts and escalators.</p> <p>(a) Lifts with the following energy efficient features :</p> <p>(i) AC variable voltage and variable frequency (VVVF) motor drive or equivalent.</p> <p>(ii) Sleep mode features or equivalent.</p> <p>(b) Escalators with energy efficient features such as motion sensors.</p>	<p>Extent of Coverage : All lifts and/or escalators</p> <p>1 point</p> <p>1 point</p> <p>1 point</p>

Part 1 – Energy Efficiency	Green Mark Points
<b>(C) General</b>	
<p><b><u>1-9 Energy Efficient Practices &amp; Features</u></b></p> <p>Encourage the use of energy efficient practices and features which are innovative and/or have positive environmental impact.</p> <p>(a) Computation of energy consumption based on design load in the form of energy efficiency index (EEI).</p> <p>(b) Use of energy efficient features :</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>■ Heat recovery system</li> <li>■ Motion sensors for staircase half landing</li> <li>■ Ductless fan for basement ventilation</li> <li>■ Sun pipes</li> <li>■ etc</li> </ul>	<p style="text-align: center;">1 point</p> <p style="text-align: center;">3 points for every 1% energy saving over the total building energy consumption</p> <p style="text-align: center;">(Up to 11 points)</p>
<b>Sub-Total (C) :</b>	Sum of Green Mark Points obtained from Item 1-5 to 1-9
<p><b><u>1-10 Renewable Energy</u></b></p> <p>Encourage the application of renewable energy sources in buildings.</p>	<p style="text-align: center;"><b><i>(Bonus Points)</i></b></p> <p style="text-align: center;">5 points for every 1% replacement of electricity (based on the total electricity consumption including tenant’s usage) by renewable energy</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">3 points for every 1% replacement of electricity (based on the total electricity consumption excluding tenant’s usage) by renewable energy</p> <p style="text-align: center;">(Up to 20 points)</p>
<p><b>PART 1 – ENERGY EFFICIENCY CATEGORY SCORE :</b></p>	$\begin{aligned} & \text{Sub-Total (A) X } \frac{\text{Air-Conditioned Building Floor Area}}{\text{Total Floor Area}} \\ & + \\ & \text{Sub-Total ( B) X } \frac{\text{Non Air-Conditioned Building Floor Area}}{\text{Total Floor Area}} \\ & + \\ & \text{Sub-Total (C)} \\ & + \\ & \text{Bonus points (Item 1-10)} \end{aligned}$ <p>where Sub-Total (A) = Sum of Green Mark Points obtained under Section (A) that is Item 1-1 to 1-2</p> <p>Sub-Total (B) = Sum of Green Mark Points obtained under Section (B) that is item 1-3 to 1-4</p> <p>Sub-Total (C) = Sum of Green Mark Points obtained under Section (C) that is item 1-5 to 1-9</p> <p>If either Section (A) or Section (B) is not applicable, no prorating of areas is required for the score computation.</p>

Part 2 – Water Efficiency	Green Mark Points			
<p><b><u>2-1 Water Efficient Fittings</u></b> Encourage the use of water efficient fittings covered under the Water Efficiency Labelling Scheme (WELS).</p>	<p><b>Rating based on Water Efficiency Labelling Scheme (WELS)</b></p>		<p>Points awarded based on the number and water efficiency rating of the fitting type used  (Up to 8 points)</p>	
	Good	V Good		Excellent
	Weightage			
	4	6	8	
<p><b><u>2-2 Water Usage and Leak Detection</u></b> Promote the use of sub-metering and leak detection system for better control and monitoring.</p> <p>(a) Provision of sub-meters for major water uses which includes irrigation, cooling tower and tenants’ usage.</p> <p>(b) Linking all sub-meters to the Building Management System (BMS) for leak detection.</p>			<p>1 point</p> <p>1 point</p>	
<p><b><u>2-3 Irrigation System</u></b> Provision of suitable systems that utilise rainwater or recycled water for landscape irrigation to reduce potable water consumption.</p> <p>(a) Use of non potable water including rainwater for landscape irrigation.</p> <p>(b) Use of water efficient irrigation system.</p>			<p>1 point</p> <p>Extent of Coverage : At least 50% of the landscape areas are served by the system</p> <p>1 point</p>	
<p><b><u>2-4 Water Consumption of Cooling Tower</u></b> Reduce potable water use for cooling purpose.</p> <p>(a) Use of cooling tower water treatment system which can achieve 6 or better cycles of concentration at acceptable water quality.</p> <p>(b) Use of NEWater or on-site and recycled water from approved sources.</p>			<p>1 point</p> <p>1 point</p>	
<p><b>PART 2 – WATER EFFICIENCY CATEGORY SCORE :</b></p>	<p>Sum of Green Mark Points obtained from Item 2-1 to 2-4</p>			

Part 3 – Environmental Protection	Green Mark Points
<p><b><u>3-1 Sustainable Construction</u></b></p> <p>Encourage the adoption of building designs, construction practices and materials that are environmentally friendly and sustainable.</p> <p>(a) More efficient concrete usage for building components.</p> <p>(b) Conservation of existing building structure Applicable to existing structural elements or building envelope.</p> <p>(c) Use of sustainable materials and products in building construction such as :</p> <p>(i) Environmental friendly products that are certified under The Singapore Green Labelling Scheme (SGLS).</p> <p>(ii) Products with at least 30% recycled content by weight or volume.</p> <p>Note (5) : For products that are certified under SGLS and with at least 30% recycled contents, points can only be awarded either from item (c)(i) or (c)(ii).</p>	<p>0.1 point for every percentage reduction in the prescribed Concrete Usage Index (CUI) limit for the respective building categories  (Up to 4 points)</p> <p>Extent of Coverage : Conserve at least 50 % of the existing structural elements or building envelope (by area)  2 points</p> <p>1 point for high impact item 0.5 point for low impact item (Cap at 4 points)</p> <p>1 point for high impact item 0.5 point for low impact item (Cap at 4 points)</p> <p>(Up to 8 points)</p>
<p><b><u>3-2 Greenery</u></b></p> <p>Encourage greater use of greenery, restoration of trees to reduce heat island effect.</p> <p>(a) Greenery Provision (GnP) is calculated by considering the 3D volume covered by plants using the following Green Area Index (GAI) : Grass GAI = 1 ; Shrubs GAI = 3; Palms Trees GAI = 4; Trees GAI = 6</p> <p>(b) Restoration of trees on site, conserving or relocating of existing trees on site.</p> <p>(c) Use of compost recycled from horticulture waste.</p>	<p>GnP = 0.5 to &lt; 1.0 – 1 point GnP = 1.0 to &lt; 1.5 – 2 points GnP = 1.5 to &lt; 3.0 – 3 points GnP ≥ 3.0 – 4 points</p> <p>1 point</p> <p>1 point</p>

<b>Part 3 – Environmental Protection</b>	<b>Green Mark Points</b>
<p><b><u>3-3 Environmental Management Practice</u></b></p> <p>Encourage the adoption of environmental friendly practices during construction and building operation.</p> <p>(a) Implement effective environmental friendly programmes including monitoring and setting targets to minimise energy use, water use and construction waste.</p> <p>(b) Building quality assessed under the Construction Quality Assessment System (CONQUAS).</p> <p>(c) Developer, main builder, M &amp; E consultant and architect that are ISO 14000 certified.</p> <p>(d) Project team comprises one Certified Green Mark Manager (GMM) and/or one Certified Green Mark Professional (GMP).</p> <p>(e) Provision of building users’ guide including details of the environmental friendly facilities and features within the building and their uses in achieving the intended environmental performance during building operation.</p> <p>(f) Provision of facilities or recycling bins for collection and storage of different recyclable waste such as paper, glass, plastic etc.</p>	<p>1 point</p> <p>1 point</p> <p>0.25 point for each firm (Up to 1 point)</p> <p>1 point for GMM / 2 points for GMP (Up to 3 points)</p> <p>1 point</p> <p>1 point</p>
<p><b><u>3-4 Public Transport Accessibility</u></b></p> <p>Promote the use of public transport or bicycles to reduce pollution from individual car use with the following provision :</p> <p>(a) Good access to nearest MRT/LRT or bus stops.</p> <p>(b) Adequate bicycles parking lots.</p>	<p>1 point</p> <p>1 point</p>
<p><b><u>3-5 Refrigerants</u></b></p> <p>Reduce the potential damage to the ozone layer and the increase in global warming through the release of ozone depleting substances and greenhouse gases.</p> <p>(a) Refrigerants with ozone depletion potential (ODP) of zero or with global warming potential (GWP) of less than 100.</p> <p>(b) Use of refrigerant leak detection system at critical areas of plant rooms containing chillers and other equipments with refrigerants.</p>	<p>1 point</p> <p>1 point</p>
<p><b>PART 3 – ENVIRONMENTAL PROTECTION CATEGORY SCORE :</b></p>	<p>Sum of Green Mark Points obtained from Item 3-1 to 3-5</p>

<b>Part 4 – Indoor Environmental Quality</b>	<b>Green Mark Points</b>
<p><b><u>4-1 Thermal Comfort</u></b></p> <p>Air-conditioning system is designed to allow for cooling load variations due to fluctuations in ambient air temperature to ensure consistent indoor conditions for thermal comfort.</p> <p>Indoor temp between 22.5 to 25.5 °C Relative Humidity &lt; 70%</p>	<p>2 points</p>
<p><b><u>4-2 Noise Level</u></b></p> <p>Occupied spaces in buildings are designed with good ambient sound levels as recommended in SS CP 13.</p>	<p>2 points</p>
<p><b><u>4-3 Indoor Air Pollutants</u></b></p> <p>Minimise airborne contaminants, mainly from inside sources to promote a healthy indoor environment.</p> <p>(a) Use of low volatile organic compounds (VOC) paints certified under The Singapore Green Labelling Scheme (SGLS).</p> <p>(b) Use of adhesives certified under The Singapore Green Labelling Scheme (SGLS) for composite wood products.</p>	<p>Extent of Coverage : At least 90% of the total internal wall areas</p> <p>1 point</p> <p>1 point</p>
<p><b><u>4-4 High Frequency Ballasts</u></b></p> <p><i>Applicable to offices, classrooms and the like</i></p> <p>Improve workplace lighting quality by avoiding low frequency flicker associated with fluorescent lighting with the use of high frequency ballasts in the fluorescent luminaries.</p>	<p>Extent of Coverage : At least 90% of all applicable areas that are served by fluorescent luminaries</p> <p>2 points</p>
<p><b>PART 4 – INDOOR ENVIRONMENTAL QUALITY</b></p> <p><b>CATEGORY SCORE :</b></p>	<p>Sum of Green Mark Points obtained from Item 4-1 to 4-4</p>

Part 5 – Other Green Features	Green Mark Points
<p><b><u>5-1 Green Features and Innovations</u></b></p> <p>Encourage the use of other green features which are innovative and/or have positive environmental impact.</p> <p>Examples :</p> <ul style="list-style-type: none"> <li>■ Pneumatic waste collection system</li> <li>■ Rainwater harvesting</li> <li>■ Dual chute system</li> <li>■ Self cleaning façade system</li> <li>■ Infiltration trenches</li> <li>■ Integrated storm water retention/treatment into landscaping</li> <li>■ etc</li> </ul>	<p>2 points for high impact item</p> <p>1 point for medium impact item</p> <p>0.5 point for low impact item</p> <p>(Up to 7 points)</p>
<p align="center"><b>PART 5 – OTHER GREEN FEATURES CATEGORY SCORE :</b></p>	<p align="center">Sum of Green Mark Points obtained from Item 5-1</p>

### Green Mark Score

$$\text{Green Mark Score} = \sum \text{Category Score [ (Part 1 – Energy Efficiency) + (Part 2 – Water Efficiency) + (Part 3 – Environmental Protection) + (Part 4 – Indoor Environmental Quality) + (Part 5 – Other Green Features) ]}$$

where Category Score for Part 1 ≥ 30 Green Mark points and

∑ Category Score for Part 2, 3, 4 & 5 ≥ 20 Green Mark points