



**BCA Green Mark for
Existing Residential Buildings
Version ERB 1.1**

Green Mark Assessment Criteria for Existing Residential Buildings V1.1

To achieve GREEN MARK CERTIFIED	
<u>ENERGY EFFICIENCY</u>	
Comply with any option below:	
Option A	EEl of 40 kWh/m ² /year
Option B	Demonstrate 10% energy savings over the last five years (against own historical baseline)
Option C	Demonstrate 10% committed energy savings over the next five years (against own historical baseline)
Provision and monthly monitoring of main electrical meter readings for the whole development	
Lighting Density: 10% better than lighting power budget in SS530	
Lifts with energy efficient features such as Variable Voltage and Variable Frequency(VVVF) motor drive and sleep mode	
Energy Policy & Management - (to comply with section 1-2)	
<u>WATER EFFICIENCY</u>	
Provision and monthly monitoring of main water meter readings for the whole development	
Display of posters on water conservation	
Water Efficiency Improvement Plans	
Use of water efficient cleaning equipment	
<u>SUSTAINABLE OPERATION & MANAGEMENT</u>	
Circulation of Green Guides to residents	
Sustainable operational plans – regular review of environmental policy and cleaning strategies	
Promotional materials on recycling and provision of recycling bins	
Waste management improvement plan	
<u>COMMUNITY AND WELL-BEING</u>	
Green activities - once a year	
Residents' Feedback & Evaluation - (to comply with section 4-2)	
Greeneries equivalent to GnP of 0.5 and compost recycled from horticulture waste	

*The BCA Green Mark Certified standards above that add up to 50 points will form the minimum **prerequisites** for BCA Green Mark Gold ratings and above.

ASSESSMENT CRITERIA		POINTS AVAILABLE	PRE REQUISITIES
ENERGY EFFICIENCY (To achieve minimum 30 points)			
Minimum 30 points to be scored	Part 1 – Energy Efficiency		
	1-1 Energy Efficiency Index	33	15
	1-2 Energy Policy & Management	3	3
	1-3 Energy Monitoring	3	1
	1-4 Natural Ventilation for Common Areas & Car Parks	3	-
	1-5 Lightings	15	10
	1-6 Lifts	4	1
	Sub-total (Part 1)	61	30
OTHER GREEN REQUIREMENTS (To achieve minimum 20 points)			
Minimum 20 points to be scored	Part 2 - Water Efficiency		
	2-1 Water Efficient Fittings	3	-
	2-2 Water Monitoring	3	2
	2-3 Water Efficiency Improvement Plans	2	2
	2-4 Washing of Water Tanks	2	-
	2-5 Irrigation System	3	-
	2-6 Common Area Washing	5	2
	Part 3 - Sustainable Operation & Management		
	3-1 Building Operation & Maintenance	4	3
	3-2 Waste Management	5	3
	3-3 Public Transport Accessibility	2	-
	3-4 Storm-water Management	4	-
	3-5 Sustainable Products	3	-
	Part 4 – Community and Well-being		
	4-1 Community Involvement in Green Activities	7	2
	4-2 Residents' Feedback & Evaluation	5	4
	4-3 Greenery	7	2
	4-4 Noise Level	1	-
	4-5 Lighting Quality	1	-
	4-6 Location of Refuse Chutes	1	-
Part 5 – Other Green Features			
	8	-	
	Sub-total (Part 2-5)	66	20
GRAND TOTAL		137	50

Green Mark Award Rating

Green Mark Points	Green Mark Rating
90 and above	Green Mark Platinum
85 to <90	Green Mark Gold ^{Plus}
75 to <85	Green Mark Gold
50 to <75	Green Mark Certified

Prerequisites for Gold Plus

- At least 2 green activities per year

Prerequisites for Platinum

- At least 3 green activities per year

Elective Requirements

**The underscored points are prerequisites.*

Part 1 - Energy Efficiency (Min 30 points)	Green Mark points
<p><u>1-1 Energy Efficiency Index</u></p> <p>(a) Energy Efficiency Index (EEI) for Common Area</p> <p><u>Option A</u></p> <p>To achieve increased building energy efficiency in common areas against other residential developments to promote efficient use of energy in common areas and facilities.</p> <p><u>Option B</u></p> <p>Energy savings over its own historical baseline over the last five years must be demonstrated.</p>	<p><u>Option A</u></p> <p><u>15 points</u> for EEI of 40 kWh/m²/year</p> <p>Additional 0.2 point for every subsequent percentage improvement from 40 kWh/m²/year (up to 10 points)</p> <p><u>Option B</u></p> <p><u>15 points</u> for achieving 10% energy savings from own historical baseline</p> <p>Additional 0.2 point for every subsequent percentage improvement from 10% savings (up to 10 points)</p>
<p>(b) Energy Efficiency for households</p> <p>Household energy savings of the development benchmark against National household average consumption.</p>	<p>0.2 point for every subsequent percentage improvement from the national average (up to 8 points)</p>
<p><u>1-2 Energy Policy & Management</u></p> <p>Energy policy, energy targets and regular review as part of an environmental strategy</p> <p>To show intent, measures and implementation strategies of energy efficiency improvement plans over the next five years.</p> <p>Annual disclosure of building energy consumption data to BCA. Monthly energy bills and summary of energy bills should be provided.</p>	<p><u>1 point</u></p> <p><u>1 point</u></p> <p><u>1 point</u></p>

<p><u>1-3 Energy Monitoring</u></p> <p>Encourage the design of system that monitor and manage electricity consumption.</p> <p>Provision and monthly monitoring of main electrical meter readings for the whole development.</p> <p>Provision and monthly monitoring of electrical sub meter readings to manage the electricity use of each key building services such as common area lightings, lifts, club house, car park mechanical ventilation fans, pumps, etc.</p>	<p><u>1 point</u></p> <p>2 points</p>
<p><u>1-4 Natural Ventilation for Common Areas & Car Parks</u></p> <p>Encourage the use of energy efficient design and control of ventilation systems in car parks and common areas.</p> <p>(a) Cross ventilation in common areas such as lift lobby, corridor and staircases.</p> <p>(b) Car park</p> <p>Car parks designed with 100% natural ventilation</p> <p>or</p> <p>CO sensors used to regulate the demand for car park mechanical ventilation</p>	<p>1 point</p> <p>2 points</p> <p>or</p> <p>1 point</p>
<p><u>1-5 Lightings</u></p> <p>Encourage the use of energy efficient lightings or day-lighting in common areas to minimize energy consumption from lighting usage while maintaining proper lighting level</p> <ul style="list-style-type: none"> • Artificial lightings in common areas • Baseline = Maximum lighting power budget stated in SS530 	<p><u>10 points</u> for achieving lighting power density of 10% better than lighting power budget in SS530</p> <p>Additional 0.2 point for every subsequent percentage improvement (up to 5 points)</p>
<p><u>1-6 Lifts</u></p> <p>Encourage the use of lifts with energy efficient features such as AC Variable Voltage and Variable Frequency (VVVF) motor drive and sleep mode features</p> <p>Use of gearless lift</p> <p>Use of regenerative lift</p>	<p><u>1 point</u></p> <p>1 point</p> <p>2 points</p>

<p><u>1-7 Renewable Energy/ Energy Efficient Features</u> <u>(Bonus)</u></p> <p>Encourage the use of renewable energy or other energy efficient features which are innovative and have positive environmental impact:</p> <p>Examples:</p> <ul style="list-style-type: none"> • Solar energy • Wind energy • Heat recovery system • Motion/Photo sensors • Ductless mechanical ventilation fans • Optimization of pumping systems • Sun pipes • Etc. 	<p>(Bonus)</p> <p>1 point for every 1% replacement of energy consumption in common areas by renewable/ other energy efficient features</p> <p>(Up to 10 points)</p>
<p style="text-align: right;">Part 1 – Energy Efficiency SUB-TOTAL :</p>	

Part 2 – Water Efficiency	Green Mark points
<p><u>2-1 Water Efficient Fittings</u></p> <p>Encourage the use of water efficient fittings for common areas covered under the Water Efficiency Labelling Scheme (WELS) or adopt equivalent water efficient flow-rates/ flush volumes:-equivalents flow-rates</p> <p>(a) Basin Taps and Mixers (b) Dual flushing low capacity flushing cistern (c) Showers (d) Sink/Bib Taps and Mixers (e) Urinals (f) All other water fittings</p>	<p><u>Rating based on Water Efficiency Labelling Scheme (WELS)</u> Very Good – 2 points Excellent – 3 points</p> <p>Points awarded based on the number and water efficiency rating of the fitting types used (Up to 3 points)</p>
<p><u>2-2 Water Monitoring</u></p> <p>Encourage the design of system that can monitor and manage water consumption.</p> <p>Provision and monthly monitoring of main water meter readings for the whole development.</p> <p>Provision and monthly monitoring of water sub-meter readings to track water usage of major water consuming areas. (i.e. common area washing, irrigation, car washing, water feature, swimming pool etc.)</p> <p>Display of promotional posters to encourage water saving practices and to prevent illegal water tapping.</p>	<p><u>1 point</u></p> <p>1 point</p> <p><u>1 point</u></p>
<p><u>2-3 Water Efficiency Improvement Plans</u></p> <p>Set plans that include targets to improve building’s water performance against its own historical baseline, a breakdown of the current water use, list of water saving measures, and implementation timelines for the measures over the next five years. Committed water savings accrued from proposed measures should be quantified.</p>	<p><u>2 points</u></p>
<p><u>2-4 Washing of Water Tanks</u></p> <p>Reuse the water from the annual water tank cleaning for non-potable usage such as common area washing, irrigation, etc.</p>	<p>2 points</p>

<p><u>2-5 Irrigation System</u></p> <p>Provision of suitable systems that can utilise rainwater or recycled water for landscape irrigation, and use of plants that require minimal irrigation to reduce potable water consumption.</p> <p>Use of non-potable water for irrigation</p> <p>Use of water efficient irrigation system</p> <p>Use of drought tolerant plants</p>	<p>More than 50% of the applicable area : 1 point More than 25% of the applicable area : 0.5 point</p> <p>1 point</p> <p>1 point</p> <p>1 point</p>
<p><u>2-6 Common Area Washing</u></p> <p>Use of water efficient cleaning equipment with a flow-rate rating of;</p> <p>(a) Less than 12 l/min</p> <p>(b) Less than 8.5 l/min</p> <p>The lance for the cleaning equipment to be equipped with a spring-loaded ON/OFF control to ensure that the pump and flow of water is immediately turned off when the spring-loaded control on the lance is released.</p> <p>Use of non-potable water for common area washing</p>	<p><u>1 point</u></p> <p>2 points</p> <p><u>1 point</u></p> <p>1 point</p>
<p style="text-align: right;">Part 2 – Water Efficiency SUB-TOTAL :</p>	

Part 3 – Sustainable Operation & Management	Green Mark points
<p><u>3-1 Building Operation & Maintenance</u></p> <p>Green Guides that promote best practices to reduce energy use, water use and waste generation should be documented and disseminated to residents.</p> <p>Operation plans that reflect the sustainability goals set for the development should be actively implemented and regularly reviewed.</p> <p>(a) Environmental policy and cleaning strategies & schedule</p> <p>(b) Standard Operating Procedures (SOPs) for SARs, Bird flu, H1N1 etc. including increased frequency of cleaning common areas/ facilities.</p>	<p><u>2 points</u></p> <p><u>1 point</u></p> <p>1 point</p>
<p><u>3-2 Waste Management</u></p> <p>Encourage waste recycling within development to reduce waste going to landfill.</p> <p>Promotional materials such as posters, circulars and recycling bags on waste sorting, collecting, and recycling of waste for households.</p> <p>Provision of recycling bins (glass, paper, metal, non-recyclable waste and etc.)</p> <p>(a) At a central location</p> <p>(b) At every block</p> <p>Monthly monitoring of the amount of general waste and recyclable items</p> <p>Waste management improvement plan.</p>	<p><u>1 point</u></p> <p><u>1 point</u></p> <p>1 Point</p> <p>1 point</p> <p><u>1 point</u></p>
<p><u>3-3 Public Transport Accessibility</u></p> <p>Promote the use of public transport or bicycles to reduce environmental impact by not driving individual car</p> <p>(a) Provisions for access to MRT/LRT or bus stops</p> <p>(b) Provisions for adequate bicycle parking lots</p>	<p>1 point</p> <p>1 point</p>

<p><u>3-4 Storm-water Management</u></p> <p>Encourage the treatment of storm-water runoff before discharge to the public drain.</p> <p>Provisions of the following ABC Waters design features within the site</p> <ul style="list-style-type: none"> • Bio-retention swales / other Bio-retention systems • Rain Gardens • Constructed wetlands • Cleansing biotopes <p><i>* Note: Singapore is adopting ABC Waters Management strategy where water will be retained and treated by natural means such as plants and soil media for water quality improvement using the green features called "ABC Waters Design Features".</i></p>	<p>Points scored based on the extent of the storm-water treatment. (Up to 4 points)</p> <p>4 points for treatment of run-off from more than 30% of total site area or paved area</p> <p>3 points treatment of run-off from 20% to 30% of total site area</p> <p>2 points treatment of run-off from 10% to 20% of total site area</p> <p>1 point treatment of run-off from 5% to 10% of total site area</p>
<p><u>3-5 Sustainable Products</u></p> <p>Promote use of environmentally friendly products that are certified by approved local certification body.</p>	<p>3 points</p>
<p>Part 3 – Sustainable Operation & Management SUB-TOTAL :</p>	

Part 4 – Community and Well-being	Green Mark points																								
<p><u>4-1 Community Involvement in Green Activities</u></p> <p>Encourage residents to participate in green activities.</p>	<p><u>2 points</u> (At least 1 green activity per year)</p> <p>Additional 1 point for each additional green activity organized per year (up to 5 points)</p>																								
<p><u>4-2 Residents’ Feedback & Evaluation</u></p> <p>Provide effective feedback channels (i.e. hotline, email and etc.) for residents to take ownership of the precinct.</p> <p>Conduct door-to-door satisfaction survey to enhance quality of the living environment in common facilities.</p> <p>Provide a proper evaluation of the feedback/survey.</p> <p>List of the follow-ups taken accordingly.</p>	<p><u>2 points</u></p> <p>1 point</p> <p><u>1 point</u></p> <p><u>1 point</u></p>																								
<p><u>4-3 Greenery</u></p> <p>Encourage greater use and maintenance of greenery to reduce heat island effect.</p> <p>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; Palm Trees GAI = 4 ; Trees GAI = 6</p> <p>Use of compost recycled from horticulture waste</p>	<p><u>1 point</u> for GnP ≥ 0.5</p> <p>Additional 0.5 point for every 0.5 increment in GnP above 0.5 (up to 6 points)</p> <table border="1" data-bbox="892 1305 1422 1821"> <thead> <tr> <th>GnP</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td>≥ 0.5</td> <td><u>1 pt</u></td> </tr> <tr> <td>≥ 1.0</td> <td>1.5 pts</td> </tr> <tr> <td>≥ 1.5</td> <td>2 pts</td> </tr> <tr> <td>≥ 2.0</td> <td>2.5 pts</td> </tr> <tr> <td>≥ 2.5</td> <td>3.0 pts</td> </tr> <tr> <td>≥ 3.0</td> <td>3.5 pts</td> </tr> <tr> <td>≥ 3.5</td> <td>4.0 pts</td> </tr> <tr> <td>≥ 4.0</td> <td>4.5 pts</td> </tr> <tr> <td>≥ 4.5</td> <td>5.0 pts</td> </tr> <tr> <td>≥ 5.0</td> <td>5.5 pts</td> </tr> <tr> <td>≥ 5.5</td> <td>6 pts</td> </tr> </tbody> </table> <p><u>1 point</u></p>	GnP	Points	≥ 0.5	<u>1 pt</u>	≥ 1.0	1.5 pts	≥ 1.5	2 pts	≥ 2.0	2.5 pts	≥ 2.5	3.0 pts	≥ 3.0	3.5 pts	≥ 3.5	4.0 pts	≥ 4.0	4.5 pts	≥ 4.5	5.0 pts	≥ 5.0	5.5 pts	≥ 5.5	6 pts
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<p><u>4-4 Noise Level</u></p> <p>Internal noise level is maintained with good ambient sound level.</p>	<p>1 point</p>
<p><u>4-5 Lighting Quality</u></p> <p>Encourage sufficient lighting level for visibility and security. Lighting level to comply with CP 38/ SS531 for common areas.</p>	<p>1 point</p>
<p><u>4-6 Location of Refuse Chutes</u></p> <p>Minimise airborne contaminants from waste by locating refuse chutes at open ventilation area such as service balconies or common corridors.</p>	<p>1 point</p>
<p>Part 4 – Indoor Environmental Quality SUB-TOTAL :</p>	

Part 5 – Other Green Features	Green Mark points
<p>Encourage the use of other green features which are innovative and have positive environmental impact.</p> <p>Examples :</p> <ul style="list-style-type: none"> ● Pneumatic waste collection system ● Dual chute system ● Cool paints ● Self cleaning façade system ● Grey water harvesting system ● Green roof and vertical greeneries ● Compost bins to recycle organic waste ● Siphonic rainwater discharge system ● Etc. 	<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 8 points)</p>
<p>Part 5 – Other Green Features SUB-TOTAL :</p>	