Building and Construction Authority

We shape a safe, high quality, sustainable and friendly built environment.

Circular No : BCA/GM ENRB V3/2012-07-TD
Date : 26 July 2012

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CIRCULAR TO PROFESSIONAL INSTITUTES / ASSOCIATIONS

REVISED BCA GREEN MARK CRITERIA FOR EXISTING NON-RESIDENTIAL BUILDINGS VERSION 3

Objective

1 This is to inform the industry on the upcoming revision to the Green Mark standards for existing non-residential buildings and the implementation timeline.

Background

2 The BCA Green Mark Scheme was launched in Jan 2005 including the Green Mark for Non-Residential Existing Buildings (GM ENRB). Through the years, GM ENRB has gone through two revisions; the last revision was in 2009 with Version 2.1.

3 In April 2009, The Inter-Ministerial Committee on Sustainable Development (IMCSD) set a target to have at least 80% of the buildings in Singapore to achieve the minimum Green Mark standards by 2030. To meet this target, BCA place emphasis on the 'greening' of the existing buildings. Together with government's commitment to reduce the carbon emissions and energy intensity, BCA has embarked on a review on the GM ENRB criteria to further enhance its framework for greater energy efficiency in existing buildings.

Details of the Revision

4 This revision places more emphasis and focus on the building system energy efficiency for point scoring. The pre-requisite requirements to attain Gold, Goldplus and Platinum ratings have also been revised.

5 To facilitate better understanding, we have enclosed the revised criteria and changes in Annexes A and B for your reference.

Implementation Timeline

7 The revised BCA Green Mark criteria for Existing Buildings (GM ENRB Version 3) will be implemented with immediate effect.

8 A grace period of about 2 months will be given for buildings that want to be assessed under Version 2.1. They should submit their applications latest by 30 September 2012. All applications received after this date will be assessed and certified based on Version 3 criteria.

9 Existing applications assessed under Version 2.1 shall complete the assessment within a one year grace period i.e. by 31st July 2013.

Clarification and enquiries

10 For clarifications and enquiries, please contact the following officers:-

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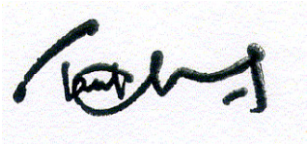
11 We would appreciate it if you could convey the contents of this circular to the members of your institutes / associations.

Thank you.



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Annex A

BCA Green Mark Criteria for Existing Non-Residential Buildings Version 3

Summary of Main Changes

The changes in the BCA Green Mark Criteria for Existing Non-Residential Buildings Version 3 include the following:

1. Transition from Energy Savings/EEI to Building System Efficiency Approach

This Version 3 criteria place more emphasis and focus on building system energy efficiency for point scoring. The previous pre-requisite energy criteria based on EEI, or Option A i.e. to demonstrate 10% energy savings over the last three years (against own historical baseline) or Option C i.e. based on committed energy savings over the next three years of 10% savings, has been removed. The new scoring approach is based on the percentage improvement of the respective building system.

2. Maximum Cap of 50 points no longer applicable

The cap of 50 points for both Energy Related Requirement and other Green Requirement will be removed to encourage the design team to explore more energy or resource efficient options.

3. Pre-requisite Requirement to attain Green Mark Certification

- Minimum 30 points obtained from Part 1 Energy Efficiency and minimum 20 points from other Green Requirement (Part 2 to Part 5)
- Minimum air-conditioned system efficiency of 0.75 kW/ton for cooling load of more than 500 tons
- Minimum air-conditioned system efficiency of 0.85 kW/ton for cooling load of 500 tons or less
- Permanent Instrumentation for monitoring of chilled water plant operating system efficiency & heat balance
- To conduct full Indoor Air Quality audit

4. Additional Pre-requisite Requirement to attain Green Mark Gold, Gold^{Plus} and Platinum rating

For Green Mark Gold Rating

- Minimum air-conditioned system efficiency of 0.70 kW/ton for cooling load of more than 500 tons
- Minimum air-conditioned system efficiency of 0.80 kW/ton for cooling load of 500 tons or less

For Green Mark Gold^{Plus} Rating

- Minimum air-conditioned system efficiency of 0.68 kW/ton for cooling load of more than 500 tons
- Minimum air-conditioned system efficiency of 0.75 kW/ton for cooling load of 500 tons or less

For Green Mark Platinum Rating

- Minimum air-conditioned system efficiency of 0.65 kW/ton for cooling load of more than 500 tons
- Minimum air-conditioned system efficiency of 0.70 kW/ton for cooling load of 500 tons or less

5. Enhance the scoring and weightage of the following criteria:-

- Better scoring for Artificial Lighting and Renewable Energy. Refer to ENRB 1-4 & 1-10
- Better scoring on Water Efficient Fittings and Alternative Water Sources. Refer to ENRB 2-2 & 2-3
- Extend the in-house building management team to GMFM & GMP. Refer to ENRB 3-1(c)
- Better scoring on conducting Post Occupancy Evaluation, provision of recycling bins and sustainable products. Refer to ENRB 3-2(a), 3-3(a) and 3-4
- Better scoring on Greenery Provision (GnP). Refer to ENRB 3-5(a)
- Better facilities for provision of sheltered bicycle parking lots with adequate shower and changing facilities. Refer to ENRB 3-7
- Better scoring for controllability of lighting system. Refer to ENRB 4-3(b)

6. New inclusion

- Thermal Performance of Buildings Envelope, ETTV. Refer to ENRB 1-1
- Air distribution system of air conditioning system. Refer to ENRB 1-2(c)
- Provision of permanent measuring instruments, Heat Balance, Provision of variable speed controls for chiller plant equipment. Refer to ENRB 1-2(d), (e) & (f)
- Ventilation in Car parks & Common Areas. Refer to ENRB 1-5 & 1-6
- Lifts & Escalators. Refer to ENRB 1-7
- Energy efficient products certified by approved local certification body. Refer to ENRB 1-8(b)
- Water consumption monitoring of the buildings on monthly basis. Refer to ENRB 2-1(a)
- Irrigation System and Landscaping. Refer to ENRB 2-5(a) & (b)
- Additional criteria for Cooling Towers. Refer to ENRB 2-6
- Provision of roof top greenery and vertical greenery. Refer to ENRB 3-5(c) & (d)
- Provision of covered walkway to facilitate connectivity and use of public transport. Refer to ENRB 3-7(b)
- Provision of priority parking lots for hybrid/electric vehicle within the development. Refer to ENRB 3-7(c)

- Implement effective IAQ management plan. Refer to ENRB 4-1(b)
- Use of high efficiency air filter. Refer to ENRB 4-1(c)
- At least one room temperature & Relative Humidity sensor display per floor. Refer to Part 4-1(d)
- At least one carbon dioxide sensor display per floor. Refer to Part 4-1(e)
- Use of low volatile organic compounds (VOC) paints & environmental friendly adhesives. Refer to Part 4-2(a) & (b)

7. Specific Details

The specific details of the criteria and changes are listed as follows:

Document	Description
Annex B-1	BCA Green Mark Criteria for Existing Non-Residential Building (GM ENRB) Version 3
Annex B-2	Comparison between current GM ENRB Version 2.1 and new GM ENRB Version 3

The BCA Green Mark Criteria for Existing Non-Residential Buildings (GM ENRB Version 3) can also be downloaded from:-
http://www.bca.gov.sg/GreenMark/green_mark_criteria.html

BCA Green Mark for Existing Non-Residential Buildings Version 3.0

Framework – BCA Green Mark for Existing Non-Residential Buildings (version 3.0)

To achieve Green Mark Award

Pre-requisite Requirement
All relevant pre-requisite requirements for the specific Green Mark Rating are to be complied with

Energy Related Requirements
Minimum 30 points

Other Green Requirements
Minimum 20 points

Elective Requirement for Energy Improvement
(Combination of the following items to meet 30 points)

Part 1 - Energy Efficiency

ENRB 1-1 Thermal Performance of Building Envelope
ENRB 1-2 Air Conditioning System
ENRB 1-3Natural Ventilation / Mechanical Ventilation
ENRB 1-4 Artificial Lighting
ENRB 1-5 Ventilation in Carparks
ENRB 1-6 Ventilation in Common Areas
ENRB 1-7 Lifts and Escalators
ENRB 1-8 Energy Efficient Practices & Feature
ENRB 1-9 Energy Policy & Management
ENRB 1-10 Renewable Energy

Elective Requirement for Other Areas
(Combination of the following items to meet 20 points)

Part 2 - Water Efficiency

ENRB 2-1 Water Monitoring
ENRB 2-2 Water Efficient Fittings
ENRB 2-3 Alternative Water Sources
ENRB 2-4 Water Efficiency Improvement Plans
ENRB 2-5 Irrigation System and Landscaping
ENRB 2-6 Cooling Towers

Part 3 – Sustainable Operation & Management

ENRB 3-1 Building Operation & Maintenance
ENRB 3-2 Post Occupancy Evaluation
ENRB 3-3 Waste Management
ENRB 3-4 Sustainable Products
ENRB 3-5 Greenery
ENRB 3-6 Environmental Protection
ENRB 3-7 Green Transport

Part 4 - Indoor Environmental Quality

ENRB 4-1 Indoor Air Quality Performance
ENRB 4-2 Indoor Air Pollutants
ENRB 4-3 Lighting Quality
ENRB 4-4 Thermal Comfort
ENRB 4-5 Internal Noise Level

Part 5 – Other Green Features

ENRB 5-1 Green Features & Innovations

POINT ALLOCATION – BCA Green Mark for Existing Non-Residential Buildings (Version 3.0)

Category		Point Allocations
(I) ENERGY EFFICIENCY		
Minimum 30 points to be scored	**Part 1 – Energy Efficiency**	
	ENRB 1-1 Thermal Performance of Building Envelope	5
	ENRB 1-2 Air Conditioning System (applicable to air-conditioned areas)	32
	ENRB 1-3 Natural Ventilation / Mechanical Ventilation (applicable to non air-conditioned areas excluding carparks and common areas)	
	ENRB 1-4 Artificial Lighting	13
	ENRB 1-5 Ventilation in Carparks	4
	ENRB 1-6 Ventilation in Common Areas	5
	ENRB 1-7 Lifts and Escalators	2
	ENRB 1-8 Energy Efficient Practices & Features	12
	ENRB 1-9 Energy Policy & Management	1
	ENRB 1-10 Renewable Energy	15
	Category Score for Part 1 – Energy Efficiency	**89**
(II) OTHER GREEN REQUIREMENTS		
Minimum 20 points to be scored	**Part 2 - Water Efficiency**	
	ENRB 2-1 Water Monitoring	4
	ENRB 2-2 Water Efficient Fittings	12
	ENRB 2-3 Alternative Water Sources	3
	ENRB 2-4 Water Efficiency Improvement Plans	1
	ENRB 2-5 Irrigation System and Landscaping	2
	ENRB 2-6 Cooling Towers	2
	Category Score for Part 2 – Water Efficiency	**24**
	Part 3 - Sustainable Operation & Management	
	ENRB 3-1 Building Operation & Maintenance	4
	ENRB 3-2 Post Occupancy Evaluation	3
	ENRB 3-3 Waste Management	7
	ENRB 3-4 Sustainable Products	8
	ENRB 3-5 Greenery	10
	ENRB 3-6 Environmental Protection	3
	ENRB 3-7 Green Transport	4
	Category Score for Part 3 – Sustainable Operation and Management	**39**
	Part 4 - Indoor Environmental Quality	
	ENRB 4-1 Indoor Air Quality Performance	8
	ENRB 4-2 Indoor Air Pollutants	2
	ENRB 4-3 Lighting Quality	5
	ENRB 4-4 Thermal Comfort	2
	ENRB 4-5 Internal Noise Level	1
	Category Score for Part 4 – Indoor Environment Quality	**18**
	Part 5 – Other Green Features	
	ENRB 5-1 Green Features & Innovations	10
	Category Score for Part 5 – Other Green Features	**10**
	Category Score for Other Green Requirements	**91**
	Green Mark Score	**180**

Green Mark Award Rating

BCA Green Mark Award Rating and Pre-requisite Requirements

Green Mark Score	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

Pre-requisite Requirements for Existing Non-residential Building Criteria

PART 1 - ENERGY EFFICIENCY

1. ENERGY EFFICIENCY

Green Mark Rating	Minimum points achievement from Part 1 – Energy Efficiency
Green Mark Certified	30 points
Green Mark Gold	35 points
Green mark Gold^{Plus}	40 points
Green Mark Platinum	45 points

2. MINIMUM SYSTEMS' EFFICIENCY

Minimum Design System Efficiency/Operating System Efficiency (DSE/OSE)

(i) For buildings using Water-Cooled Chilled-Water Plant

Green Mark Rating	Building Cooling Load (RT)	
	< 500	≥ 500
	Efficiency (kW/RT)	
Certified	0.85	0.75
Gold	0.80	0.70
Gold^{Plus}	0.75	0.68
Platinum	0.70	0.65

(ii) For Buildings using Air Cooled Chilled-water Plant or Unitary Air-Conditioner

Green Mark Rating	Building Cooling Load (RT)	
	< 500	≥ 500
	Efficiency (kW/RT)	
Certified	1.1	1.0
Gold	1.0	Not applicable
Gold^{Plus}	0.85	
Platinum	0.78	

For building with building cooling load of more than 500 RT, the use of air cooled central chilled-water plant or other unitary air-conditioners are not applicable for Gold and higher ratings.

Note: The performance of the overall air-conditioning system for the building is based on the Operating System Efficiency (OSE) of the system during the normal building operating hours as defined below:

Office Building: Monday to Friday: 9am to 6pm Retail Mall: Monday to Sunday: 10am to 9pm Institutional: Monday to Friday: 9am to 5pm	Hotel and Hospital: 24-hour Industrial and Other Building Types: To be determined based on the operating hours

3. CHILLER PLANT M&V INSTRUMENTATION

(i) Provision of permanent measuring instruments for monitoring of water-cooled chilled-water system and air-cooled chilled water system operating system efficiency. The installed instrumentation shall have the

capability to calculate resultant plant operating system efficiency (i.e. kW/RT) within 5% of its true value and in accordance with ASHRAE Guide 22 and AHRI 550/590. Heat balance test for water-cooled chilled-water system is required for verification of the accuracy of the M&V instrumentation.

4. NATURAL VENTILATION AREA (only applicable to occupied areas, excluding circulation, plant rooms and transit areas):

Pre requisite requirement for Platinum - At least 75% of natural ventilated areas with effective cross ventilation with North and South facing window opening

PART 4 - INDOOR ENVIRONMENTAL QUALITY

1. IAQ Audit - to conduct an full IAQ audit three yearly that complies with NEA's Guidelines for Good Indoor Air Quality in Office Premises or SS554:2009 Code of Practice for `Indoor air quality for air-conditioned buildings' **[4 points]** [ENRB 4-1(a)]

Energy Related Requirements

<table>
<tr><th>Part 1 - Energy Efficiency</th><th>Green Mark Points</th></tr>
<tr><td>ENRB 1-1 Thermal Performance of Building Envelope

Enhance the overall thermal performance of building envelope to minimize heat gain thus reducing the overall cooling load requirement.</td><td>0.5 points for every reduction of 1 W/m2 in ETTV from the baseline of 50 W/m^2

Point scored = 0.5 x (50 – ETTV)

(Up to 5 points)</td></tr>
<tr><td>ENRB 1-2 Air-Conditioning System
Applicable to Air-conditioned Building Areas (with an aggregate air-conditioned areas > 500m^2)

Encourage the use of better efficiency air-conditioned equipment to minimize the energy consumption. (System efficiency in kW/ton)

(a) Water-Cooled Chilled-Water Plant:
a) Water-Cooled Chiller
b) Chilled water pump
c) Condenser water pump
d) Cooling tower

<table><tr><td rowspan="2">Baseline</td><td colspan="2">Building Cooling Load</td></tr><tr><td>< 500 RT</td><td>≥500 RT</td></tr><tr><td><u>Pre-requisite Requirements</u>
Minimum system efficiency of central chilled-water plant</td><td>0.85 kW/RT</td><td>0.75 kW/RT</td></tr></table>
OR

(b) Air Cooled Chilled-Water Plant / Unitary Air-Conditioners:

Air cooled Chilled-Water Plant:
▪ Air-Cooled Chiller
▪ Chilled Water Pump

Unitary Air-Conditioners:
▪ Variable Refrigerant Flow (VRF) System
▪ Water-Cooled Package Unit
▪ Single-Spilt Unit
▪ Multi-Spilt Unit</td><td>(a) Water-Cooled Chilled-Water Plant

Building cooling load ≥ 500RT

14 points for achieving plant efficiency of 0.75 kW/ton

0.35 point for every percentage improvement in the chiller plant efficiency better than 0.75 kW/ton

Point scored = 0.35 x (% improvement)

Building cooling load < 500RT

14 points for achieving plant efficiency of 0.85 kW/ton

0.3 point for every percentage improvement in the chiller plant efficiency better than 0.85 kW/ton

Point scored = 0.3 x (% improvement)

(Up to 20 points)

OR

(b) Air-Cooled Chilled-Water Plant/Unitary Air Conditioners

Building cooling load ≥ 500RT

14 points for achieving plant efficiency of 1.0 kW/ton

0.25 point for every percentage improvement in the chiller plant efficiency better than 1.0 kW/ton

Point scored = 0.25 x (% improvement)</td></tr>
</table>

Baseline	Building Cooling Load	
	< 500 RT	≥500 RT
Pre-requisite Requirements Minimum system efficiency of air cooled chilled water plant or unitary conditioners	1.1 kW/RT	1.0 kW/RT

Note: Where there is a combination of centralised air-con system with unitary air-conditioned system, the computation for the points scored will only be based on the air-conditioning system with a larger aggregate capacity.

Building cooling load < 500RT

14 points for achieving plant efficiency of 1.1 kW/ton

0.2 point for every percentage improvement in the chiller plant efficiency better than 1.1 kW/ton

Point scored = 0.2 x (% improvement)

(Up to 20 points)

(c) Air Distribution system:
- Air Handling Units (AHUs)
- Fan Coil Units (FCUs)

Baseline – Fan power limitation in air conditioning system

Allowable nameplate motor power	
Constant volume	Variable volume
0.47 W/CMH	0.74 W/CMH

Note: For buildings using district cooling system, there is no need to compute the plant efficiency under Part 1-2 (a) and (b). The points obtained will be pro-rated based on the air distribution system efficiency under Part 1-2(c)

(c) Air Distribution System
0.15 Point for every percentage improvement in the air distribution system efficiency over the baseline

Point scored = 0.15 x (% improvement)

(Up to 8 points)

(d) *Prerequisite requirements* : Provision of permanent measuring instruments for monitoring of water-cooled chilled-water plant and air-cooled chilled-water plant efficiency. The installed instrumentation shall have the capability to calculate a resultant plant efficiency (i.e. kW/RT) within 5% of its true value and in accordance with ASHRAE Guide 22 and AHRI 550/590. The following instrumentation and installation are also required to be complied with:

- Location and installation of the measuring devices to meet the manufacturer's recommendation.
- Data acquisition system to have a minimum resolution of 16 bit.
- All data logging with capability to trend at 1 minute sampling time interval.
- Dedicated digital power meters shall be provided for the following groups of equipment: chiller(s), chilled water pump(s), condenser water pump(s) and cooling tower(s).
- Flow meters to be provided for chilled-water and condenser water loop and shall be of ultrasonic / full bore magnetic type or equivalent.
- Temperature sensors shall have a measurement uncertainty not exceeding ± 0.05 ℃ over entire measurement / calibration range. All thermo-wells shall be installed in a manner which ensures that the sensors can be

1 point

in direct contact with fluid flow. Provisions shall be made for each temperature measurement location to have two spare thermo-wells located at both side of the temperature sensor for verification of measurement accuracy.	
(e) *Prerequisite requirements* : Verification of central water cooled chilled-water plant instrumentation: Heat Balance – substantiating test for water cooled chilled-water plant to be computed in accordance with AHRI 550/590. The operating system efficiency and heat balance to be submitted to BCA upon commissioning.	1 point
(f) Provision of variable speed controls for chiller plant equipment such as chilled-water pumps and cooling tower fans to ensure better part-load plant efficiency.	1 point
(g) Sensors or similar automatic control devices are used to regulate outdoor air flow rate to maintain the concentration of carbon dioxide. Carbon dioxide acceptable range ≤ 700 ppm above outdoor	1 point
ENRB 1-3 Natural Ventilation / Mechanical Ventilation Applicable to Non Air-Conditioned Building Areas (with an aggregate non air-conditioned areas > 10% of total floor area excluding carparks and common areas)	
(a) <u>Natural Ventilation</u> (only applicable to occupied areas, excluding circulation, plant rooms and transit areas) Encourage building that facilitates good natural ventilation. Proper design of building layout that utilises prevailing wind conditions to achieve adequate cross ventilation.	20 based points will be awarded for use of natural ventilation 1.6 points for every 10% of NV areas with window openings facing north and south directions and cross ventilation (Up to 32 points)
(b) <u>Mechanical Ventilation</u> Encourage energy efficient mechanical ventilation system as the preferred ventilation mode to air-conditioning in buildings. Baseline: Fan power limitation I mechanical ventilation systems: Allowable nameplate motor power Constant volume: 0.47 W/CMH Variable volume: 0.74 W/CMH Note : Where there is a combination of naturally ventilated and mechanical ventilated spaces, the points scored will only be based on the predominant ventilation modes of normally occupied spaces.	0.6 point for every subsequent 1% improvement from the baseline (Up to 32 points)

ENRB 1-4 Artificial Lighting Encourage the use of energy efficient lighting to minimize energy consumption from lighting usage while maintaining proper lighting level. Please refer to the Annex 1 for the baselines of lighting power budget	0.3 point for every percentage improvement in lighting power budget Point scored = 0.3 x (% improvement) (Up to 13 points) Excluding tenant lighting provision – Up to 5 points)
ENRB 1-5 Ventilation in Carparks Encourage the use of energy efficient design and control of ventilation systems in carparks. (a) Carparks designed with natural ventilation. (b) CO sensors are used to regulate the demand for mechanical ventilation (MV) Note: Where there is a combination of different ventilation mode adopted for carpark design, the points obtained will be prorated accordingly.	Naturally ventilated carparks – 4 points Points scored based on the mode of mechanical ventilation provided Fume extract – 2.5 points MV with or without supply – 2 points (Up to 4 points)
ENRB 1-6 Ventilation in Common Areas Encourage the use of energy efficient of ventilation systems in the following common areas: (a) Toilets (b) Staircases (c) Corridors (d) Lift lobbies (e) Atrium	Extent of Coverage: At least 90% of each applicable area Point scored based on the mode of ventilation provided in the applicable areas Natural ventilation – 1.5 points for each area Mechanical ventilation – 0.5 point for each area (Up to 5 points)
ENRB 1-7 Lifts and Escalators Encourage the use of energy efficient lifts and escalators. Lifts and/or escalators with AC variable voltage and variable frequency (VVVF) motor drive and sleep mode features.	Extent of Coverage: All lifts and escalators Lifts – 1 point Escalators- 1 point
ENRB 1-8 Energy Efficient Practices & Features Encourage the use of energy efficient practices and features which are innovative and/or have positive environmental impact. (a) Computation of the energy consumption in the form of energy efficiency index (EEI) (b) Use of energy efficiency product that are certified by approved local certification body (c) Use of energy efficient features Example: • Re-generative lift • Heat recovery system	1 point 0.5 point for each equipment type (Up to 2 points) 2 points for every 1% energy saving over the total building energy consumption (Up to 9 points)

<table>
<tr><td>

- Motion sensors
- Sun pipes
- Light shelves
- Photocell sensors to maximize the use of daylight
- Heat pumps, etc.

</td><td></td></tr>
<tr><td>

ENRB 1-9 Energy Policy and Management

(a) Energy policy, energy targets and regular review with top management's commitment as part of an environmental strategy

(b) To show intent, measures and implementation strategies of energy efficiency improvement plans to achieve energy target set over the next three years. Committed energy savings accrued from proposed measures should be quantified.

</td><td>

0.5 point

0.5 point

</td></tr>
<tr><td>

ENRB 1-10 Renewable Energy

Encourage the application of renewable energy sources in buildings.

</td><td>

Point scored based on the expected energy efficiency index (EEI) and % replacement of electricity by renewable energy source

<table>
<tr><th rowspan="2">Energy Efficiency Index (EEI)</th><th colspan="2">Every 1% replacement of electricity (based on total electricity consumption) by renewable energy source</th></tr>
<tr><th>Include tenant's usage</th><th>Exclude tenant's usage</th></tr>
<tr><td>≥ 50 kWh/m²/yr</td><td>5 points</td><td>3 points</td></tr>
<tr><td>< 50 kWh/m²/yr</td><td>3 points</td><td>1.5 points</td></tr>
</table>

(Up to 15 points)

</td></tr>
<tr><td>

PART 1 – ENERGY EFFICIENCY CATEGORY SCORE:

</td><td>

(Part 1-2) X Air-conditioned Building Floor Area / Total Floor Area
+
(Part 1-3) X Non Air-Conditioned Building Floor Area / Total Floor Area
+
(Part 1-1, Part 1-4 to Part 1-10)

Where Part 1-2 = Total Green Mark Points obtained under Part 1-2
Part 1-3 = Total Green Mark Points obtained under Part 1-3
Part 1-1, Part 1-4 to Part 1-10 = Total Green Mark Points obtained under Part 1-1, Part 1-4 to Part 1-10

</td></tr>
</table>

Other Green Requirements

<table>
<tr><th>Part 2 - Water Efficiency</th><th colspan="3">Green Mark Points</th></tr>
<tr><td>ENRB 2-1 Water Monitoring

Provide private-metering and leak detection system for better control and monitoring.

(a) To monitor the water consumption on monthly basis

(b) Provision of private-meters for major water uses (e.g. cooling tower, water features, irrigation, swimming pools, tenants' usage)

(c) Provision of automated / smart metering for monitoring and leaking detection</td><td colspan="3">1 point

1 point

2 points</td></tr>
<tr><td rowspan="2">ENRB 2-2 Water Efficient Fittings

Encourage the use of water efficient fittings under Water Efficiency Labelling Scheme (WELS) or adopt equivalent water efficient flow-rate/flush volumes for water fittings:-
▪ Basin taps and mixers
▪ Showers
▪ Sink/Bib taps and mixers
▪ Urinals
▪ Other water efficient fittings

Or

To have PUB Water-Efficient Building Certificate</td><td colspan="2">Rating based on Water Efficiency Labeling Scheme (WELS)

Very Good | Excellent
Weightage
9 | 12</td><td>Points scored based on the number and water efficiency rating of the fitting type used

(up to 12 points)</td></tr>
<tr><td colspan="3">9 points</td></tr>
<tr><td>ENRB 2-3 Alternative Water Sources

Use of suitable systems that utilize alternative water sources for non-potable uses: irrigation, washing, water features, toilet flushing, etc (excluding cooling tower make up water) to reduce use of potable water. Alternative sources can include rainwater, greywater (for toilet flushing only), NEWater, AHU condensate and recycled water from approved sources.</td><td colspan="3">Points awarded based on % reduction in total potable water usage of the applicable uses

> 50 % - 3 points
≥ 10 % to 50 % - 2 points
< 10 % - 1 point

(Up to 3 points)</td></tr>
<tr><td>ENRB 2-4 Water Efficiency Improvement Plans

Targets to improve building water performance against own building water performance baseline should be set. To show intent, measures and implementation strategies of water efficiency improvement plans over the next three years. Committed water savings accrued from proposed measures should be quantified. (PUB water efficiency management plan is acceptable as evidence)</td><td colspan="3">1 point</td></tr>
</table>

ENRB 2-5 Irrigation System and Landscaping (a) Use of automatic water efficient irrigation system with rain sensor, soil moisture sensor or equivalent control system. (b) Use of drought tolerant plants that require minimal irrigation.	 Extent of Coverage: At least 50% of the landscape areas are served by the system 1 point Extent of Coverage: At least 50% of the landscape areas 1 point
ENRB 2-6 Cooling Towers Reduce potable water use for cooling purpose. (a) Use of cooling tower water treatment system which can achieve 7 or better cycles of concentration at acceptable water quality. (b) Use of NEWater or on-site recycled water from approved sources.	 1 point 1 point
PART 2 – WATER EFFICIENCY CATEGORY SCORE :	Sum of Green Mark Points obtained from ENRB 2-1 to 2-6

Part 3 - Sustainable Operation & Management	Green Mark Points
ENRB 3-1 Building Operation & Maintenance	
(a) The environmental policy that reflects the sustainability goals set.	1 point
(b) A green guide for the occupants or visitors should be disseminated through various channels. Best practices to reduce energy use, water use and maintain a good indoor environment should be documented in this green guide. To demonstrate evidences of occupant involvement in environmental sustainability.	1 point
(c) In-house building management team comprises one Certified Green Mark Facilities Manager (GMFM), Singapore Certified Energy Manager (SCEM) / Green Mark Professional (GMP).	0.5 point for certified GMFM 1 point for certified SCEM/GMP (Up to 1 point)
(d) The environmental management system of the building is ISO14000 or ISO 50001 certified.	1 point
ENRB 3-2 Post Occupancy Evaluation	
(a) Conduct post occupancy survey for occupant's satisfaction on energy and environmental performance. Required number of people surveyed shall be - 10% of total occupancy and up to 100 maximum. - minimum 5 people shall be surveyed if total occupancy is less than 50.	2 points
(b) List of corrective actions taken following the post occupancy evaluation, if any.	1 point
ENRB 3-3 Waste Management	
• Provision of facilities or recycling bins for collection and storage of different recyclable waste such as paper, glass, plastic, food waste, etc.	2 points
• Promote and encourage waste minimization and recycling among occupants, tenants and visitors through various avenues	2 points
• Provide the proper storage area for the recyclable waste	1 point
• To quantify and monitor the recycling programme for continuous improvement.	2 points

<table>
<tr>
<td>ENRB 3-4 Sustainable Products

Promote use of environmentally friendly products that are certified by approved local certification body and are applicable to non-structural and architectural related building components.</td>
<td colspan="3">Weightage based on the extent of environmental friendliness of products

<table>
<tr><th>Good</th><th>Very Good</th><th>Excellent</th></tr>
<tr><td>1</td><td>1.5</td><td>2</td></tr>
</table>
</td>
<td>Points scored based on the weightage and the extent of coverage & impact

1 point for high impact item
0.5 point for low impact item

(Up to 8 points)</td>
</tr>
<tr>
<td>ENRB 3-5 Greenery

Encourage greater use of greenery to reduce heat island effect.

(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

(b) Use of compost recycled from horticulture waste.

(c) Provision of roof top greenery

(d) Provision of Vertical Greenery</td>
<td colspan="4">GnP = 0.5 to < 1.0 - 1 point
GnP = 1.0 to < 2 - 2 points
GnP = 2 to < 3.0 - 3.5 points
GnP ≥ 3.0 - 5 points
(Up to 5 points)

1 point

For roof top greenery areas
≥20% and 50% of useable roof areas 1 point
≥ 50% of useable roof areas 2 points

Vertical greenery areas of
≥10m2 and <50m2 1 point
≥ 50m2 2 points</td>
</tr>
<tr>
<td>ENRB 3-6 Environmental Protection

(a) Green procurement policy – Adoption of sustainable and environmental-friendly procurement and purchasing policy in the operation and maintenance of the building.

(b) Reduce the potential damage to the ozone layer and the increase in global warming through the release of ozone depleting substances and greenhouse gases.

• Refrigerants with ozone depletion potential (ODP) of zero or with global warming potential (GWP) of less than 100.

▪ Use of refrigerant leak detection system at critical areas of plant rooms containing chillers and other equipments with refrigerants.</td>
<td colspan="4">1 point

1 point

1 point</td>
</tr>
</table>

ENRB 3-7 Green Transport Promote the use of public transport or bicycles to reduce pollution from individual car use with the following provision:	
(a) Good access to nearest MRT/LRT or bus stops.	1 point
(b) Provision of covered walkway to facilitate connectivity and the use of public transport	1 point
(c) Provision of priority parking lots for hybrid/electric vehicle within the development	1 point
(d) Provision of sheltered bicycle parking lots with adequate shower and changing facilities.	Extent of Coverage : Minimum 10 number of bicycle parking lots, cap at 30 where applicable Points scored based on the number of bicycle parking lots provided (with adequate shower and changing facilities) 1 point if the number provided ≥ 1% x GFA/10 0.5 point if the number provided ≥ 0.5% x GFA/10
PART 3 – SUSTAINABLE OPERATION AND MANAGEMENT **CATEGORY SCORE :**	Sum of Green Mark Points obtained from ENRB 3-1 to 3-7

Part 4 – Indoor Environmental Quality	Green Mark Points
ENRB 4-1 Indoor Air Quality Performance To promote a healthy indoor environment. (a) *Prerequisite Requirements :* To conduct full IAQ audit once in three years that complies with NEA's Guidelines for Good Indoor Air Quality in Office Premises or SS554:2009 Code of Practice for `Indoor air quality for air-conditioned buildings' by an accredited laboratory under Singapore Accreditation Council.	4 points
(b) Implement effective IAQ management plan to ensure building ventilation systems are frequently maintained to ensure clean delivery of air.	1 point
(c) Use of high efficiency air filter (at least MERV 13) in AHU to reduce indoor contaminants and provide good protection for cooling coil and reducing frequency or eliminating duct cleaning	1 point
(d) Room Temperature display (at least 1 unit per floor)	1 point
(e) Additional carbon dioxide sensor display (at least 1 unit per floor)	1 point
ENRB 4-2 Indoor Air Pollutants Minimise airborne contaminants, mainly from inside sources to promote a healthy indoor environment. (a) Use of low volatile organic compounds (VOC) paints certified by approved local certification body.	1 point
(b) Use of environmental friendly adhesives certified by approved local certification body.	1 point
ENRB 4-3 Lighting Quality To encourage good workplace lighting quality to promote productivity and occupant comfort	
(a) Lighting level to comply with SS531 or CP38 for various uses.	1 point
(b) Controllability of lighting system	At least 90% of occupants are able to adjust lighting to suit their task needs and preference Controlled by light switches - 1 point Controlled by task lights - 2 points (Up to 2 points)
(c) High frequency ballast	All applicable areas in the entire building that are served by fluorescent lightings

	20% to < 40% - 0.5 point 40% to < 60% - 1 point 60% to < 80% - 1.5 points 80% and above - 2 points (Up to 2 points)
ENRB 4-4 Thermal Comfort (a) Ensure the consistent indoor conditions for thermal comfort: Indoor dry-bulb temperature within 22.5 ℃ to 25.5 ℃ and relative humidity <70% (b) Controllability of temperature	 1 point 1 point
ENRB 4-5 Internal Noise Level Ensure internal noise level are maintained at an appropriate levels and to comply with CP13:1999 or SS553:2009	 1 point
PART 4 – INDOOR ENVIRONMENTAL QUALITY CATEGORY SCORE :	Sum of Green Mark Points obtained from ENRB 4-1 to 4-5

Part 5 – Other Green Features (Total Points: 10)	Green Mark Points
ENRB 5-1 Green Features and Innovations To encourage the use of other green features which are innovative or/and have positive environmental impact. Examples : • Tenants with Green Mark for Office Interior or Restaurant certificate • Green Lease • Ultraviolet light-C band (UV) emitters in air handling units (AHUs) to improve indoor air quality • Provision of carpark guidance system • Use of self cleaning façade system • Use of grey water recycling system • Titanium Dioxide coating to remove odour in toilets • Use of pneumatic waste collection system • Use of double refuse chutes for separating recyclable from non-recyclable waste • Stormwater management	2 points for high impact item 1 point for medium impact item 0.5 point for low impact item (Up to 10 Points)
PART 5 – OTHER GREEN FEATURES CATEGORY SCORE :	Sum of Green Mark Points obtained from ENRB 5-1

Green Mark Score (Existing Non-Residential)

Green Mark Score = Σ Category Score [(Part 1 – Energy Efficiency) +
(Part 2 – Water Efficiency) +
(Part 3 – Sustainable Operation and Management) +
(Part 4 – Indoor Environmental Quality) +
(Part 5 – Other Green Features)]

Where Category Score for Part 1 ≥ 30 points and Σ Category score for Part 2, 3, 4 & 5 ≥ 20 points

Annex 1: Maximum lighting power budget (including ballast loss)

Type of usage	Maximum lighting power budget (W/m2)
Offices	15
Classrooms	15
Hotel guest room	15
Lecture theatres	15
Auditoriums / Concert halls	10
Shops / Supermarkets / Departmental stores (including general, accent & display lighting)	25
Restaurants	15
Lobbies / Atriums / Concourse	10
Stairs	10
Corridors	10
Car parks	5
Electronic manufacturing and fine detail / Assembly industries	20
Medium and heavy industries	15
Warehouses / Storage areas	10

<table>
<tr><td colspan="3">Pre-requisite requirements</td></tr>
<tr><td>Criteria</td><td>Version 2.1</td><td>Version 3.0</td></tr>
<tr><td>Part 1 – Energy Efficiency</td><td><u>For Green Mark Certified level</u>
<u>Option A</u> : Demonstrate 10% energy savings over the last three years (against own historical baseline)

<u>Option B</u> : Top 50th percentile in building energy performance i.e.
EEI of 215 kWh/m^2/year for office buildings
EEI of 420 kWh/m^2/year for hotel buildings
EEI of 479 kWh/m^2/year for retail malls

<u>Option C</u> : Committed energy savings over the next three years of 10% savings (against own historical baseline)

For Green Mark Gold
▪ Offices, Hotels and Retail Malls - To achieve the following Energy Efficiency Index (EEI) i.e.
EEI of 205 kWh/m^2/year for office buildings
EEI of 404 kWh/m^2/year for hotel buildings
EEI of 459 kWh/m^2/year for retail malls
▪ Other Building Types - Demonstrate 15% energy savings over last three years

For Green Mark Gold^{Plus}
▪ Offices, Hotels and Retail Malls - To achieve the following Energy Efficiency Index (EEI) i.e.
EEI of 177 kWh/m2/yr for office buildings
EEI of 368 kWh/m2/yr for hotels
EEI of 421 kWh/m2/yr for retail malls
▪ Other Building Types - Demonstrate 30% energy savings over last three years
▪ Air-conditioning system efficiency is ≤ 0.75 kW/RT.

For Green Mark Platinum
▪ Offices, Hotels and Retail Malls - To achieve the following Energy Efficiency Index (EEI) i.e.
EEI of 154 kWh/m2/yr for office buildings
EEI of 333 kWh/m2/yr for hotels
EEI of 384 kWh/m2/yr for retail malls</td><td><table><tr><th>Green Mark Rating</th><th>Minimum points achievement from Part 1 – Energy Efficiency</th></tr><tr><td>Green Mark Certified</td><td>30 points</td></tr><tr><td>Green Mark Gold</td><td>35 points</td></tr><tr><td>Green mark Gold^{Plus}</td><td>40 points</td></tr><tr><td>Green Mark Platinum</td><td>45 points</td></tr></table></td></tr>
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<table>
<tr>
<td></td>
<td>
▪ Other Building Types - Demonstrate 35% energy savings over last three years
▪ Air-conditioning system efficiency is ≤ 0.7 kW/RT.
</td>
<td></td>
</tr>
<tr>
<td>Part 1 – Energy Efficiency: minimum system efficiency</td>
<td>Air con plant efficiency ≤ 0.9 kW/ton (measured)
Unitary air-conditioners efficiency ≥ 2.4 COP</td>
<td>
(i) buildings using Water-Cooled Chilled-Water Plant
<table>
<tr><th rowspan="2">Green Mark Rating</th><th colspan="2">Peak Building Cooling Load (RT)</th></tr>
<tr><th>< 500</th><th>≥ 500</th></tr>
<tr><th></th><th colspan="2">Efficiency (kW/RT</th></tr>
<tr><td>Certified</td><td>0.85</td><td>0 75</td></tr>
<tr><td>old</td><td>0.80</td><td>0.70</td></tr>
<tr><td>Gold^{Plus}</td><td>0.75</td><td>0.68</td></tr>
<tr><td>Platinum</td><td>0.70</td><td>0.65</td></tr>
</table>
(ii) For Buildings using Air Cooled Chilled-water Plant or Unitary Air-Conditioner
<table>
<tr><th rowspan="2">Green Mark Rating</th><th colspan="2">Peak Building Cooling Load (RT)</th></tr>
<tr><th>< 500</th><th>≥ 500</th></tr>
<tr><th></th><th colspan="2">Efficiency (kW/RT</th></tr>
<tr><td>Certified</td><td>1.1</td><td>1.0</td></tr>
<tr><td>old</td><td>1.0</td><td rowspan="3">Not applicable</td></tr>
<tr><td>Gold^{Plus}</td><td>0.85</td></tr>
<tr><td>Platinum</td><td>0.78</td></tr>
</table>
</td>
</tr>
<tr>
<td>Part 1 – Permanent measuring instruments for monitoring of water-cooled chilled-water system and air-cooled chilled water system operating system efficiency.</td>
<td>Nil</td>
<td>
Provision of permanent measuring instruments for monitoring of water-cooled chilled-water system and air-cooled chilled water system operating system efficiency.

The installed instrumentation shall have the capability to calculate resultant plant operating system efficiency (i.e. kW/RT) within 5% of its true value and in accordance with ASHRAE Guide 22 and AHRI 550/590.

Heat balance test for water-cooled chilled-water system is required for verification of the accuracy of the M&V instrumentation.
</td>
</tr>
</table>

Part 1 – Natural Ventilation	Nil	Pre-requisite requirement for Platinum – At least 75% of natural ventilated areas with effective cross ventilation with north and south facing window opening
Part 2 – Water Efficiency	▪ At least 10 points under Water Efficiency for Green Mark GoldPlus ▪ At least 12 points under Water Efficiency for Green Mark Platinum	Nil
Part 2 - Water Efficiency: Water efficiency fitting	To achieve PUB's Water Efficient Building Certification	Nil
Part 3 – Sustainable Operation management: Waste management	▪ Provision of facilities or recycling bins for collection and storage of different recyclable waste • Promote and encourage waste minimization and recycling among occupants, tenants and visitors through various avenues ▪ Engage the recycling company to quantify, monitor and recycle of a large range of waste generated in-house	Nil
Part 4 – Indoor Environmental Quality	▪ To comply with outdoor air supply requirements for mechanical ventilation stipulated in CP13:1999 ▪ Illuminance (lux) level to comply with SS531/CP 38 for various uses & indoor thermal environment (Temperature and relative humidity) to comply with CP 13	Nil

Part 1 – Energy Efficiency		
Criteria	Version 2.1 (Capped at 50 points max)	Version 3.0 (no cap)
NREB 1-1 Thermal Performance of Building Envelope	-	0.5 points for every reduction of 1 W/m2 in ETTV from the baseline of 50 W/m^2 (up to 5 points)
NREB 1-2 Air Conditioning System	Water-cooled chilled water plant 7 points for achieving Efficiency of 0.9 kW/ton 1.0 point for every subsequent 0.05 kW/ton improvement from 0.9 kW/ton (cap at 13 points) or Unitary air-conditioners/condensing units: 7 points for achieving Efficiency of 2.4 COP 0.6 point for every subsequent 0.15 COP improvement from 2.4 COP (cap at 13 points).	(a) Water-Cooled Chilled-Water Plant <u>If peak building cooling load ≥ 500RT</u> **14 points for achieving plant efficiency of 0.75 kW/ton** 0.35 point for every percentage improvement in the chiller plant efficiency better than 0.75 kW/ton <u>If peak building cooling load < 500RT</u> **14 points for achieving plant efficiency of 0.85 kW/ton** 0.3 point for every percentage improvement in the chiller plant efficiency better than 0.85 kW/ton (Up to 20 points) **OR** (b) Air-Cooled Chilled-Water Plant/Unitary Air Conditioners <u>Peak building cooling load ≥ 500RT</u> **14 points for achieving plant efficiency of 1.0 kW/ton** 0.25 point for every percentage improvement in the chiller plant efficiency better than 1.0 kW/ton

		<u>Peak building cooling load < 500RT</u> **14 points for achieving plant efficiency of 1.1 kW/ton** 0.2 point for every percentage improvement in the chiller plant efficiency better than 1.1 kW/ton (Up to 20 points) (c) Air Distribution System 0.15 Point for every percentage improvement in the air distribution system efficiency over the baseline Point scored = 0.15 x (% improvement) (Up to 8 points) (d) 1 point for the provision of permanent measuring instruments for monitoring of water-cooled chilled-water plant and air-cooled chilled-water plant efficiency. The installed instrumentation shall have the capability to calculate resultant plant efficiency (i.e. kW/RT) within 5% of its true value and in accordance with ASHRAE Guide 22 and AHRI 550/590. (e) 1 point for Heat Balance substantiating test for water cooled chilled-water plant to be computed in accordance with AHRI 550/590. The operating system efficiency and heat balance to be submitted to BCA upon commissioning. (f) 1 point for provision of variable speed controls for chiller plant equipment (g) Sensors or similar automatic control devices are used to regulate outdoor air flow rate to maintain the concentration of carbon dioxide

NREB 1-3 Natural Ventilation / Mechanical Ventilation	7 points for achieving efficiency of 0.47 W/CMH for CAV system and 0.74 W/CMH for VAV system.(cap at 13 points) Full 13 points will be awarded for the use of 100% natural ventilation	(a) Natural Ventilation System • 20 based points will be awarded for use of natural ventilation • 1.6 points for every 10% of NV areas with window openings facing north and south directions and cross ventilation (Up to 32 points) (b) Mechanical Ventilation System 0.6 point for every subsequent 1% improvement from the baseline (Up to 32 points)
NREB 1-4 Artificial Lighting	• points for achieving lighting density of 5% better than lighting power budget in SS530 • 0.5 point for every subsequent percentage improvement from baseline lighting density of 5% better than lighting power budget in SS530 (Up to 8 points) • Up to 4 points if tenant lighting provision are excluded •	• 0.3 points for every percentage improvement in lighting power budget (up to 13 points) • Up to 4 points if tenant lighting provision are excluded
NREB 1-5 Ventilation in Carparks	-	• Naturally ventilated carparks – 4 points • Points scored based on the mode of mechanical ventilation provided with CO sensors control: Fume extract – 2.5 points MV with or without supply – 2 points
NREB 1-6 Ventilation in Common Areas	-	• Point scored based on the mode of ventilation provided in the applicable areas (toilets, staircases, corridors, lift lobbies, atrium) • Natural ventilation – 1.5 points for each area • Mechanical ventilation – 0.5 point for each area • Extent of Coverage: At least 90% of each applicable area

<table>
<tr>
<td>NREB 1-7 Lifts and Escalators</td>
<td>-</td>
<td>
• Lifts and/or escalators with AC variable voltage and variable frequency (VVVF) motor drive and sleep mode features.
• Lifts – 1 point
• Escalators- 1 point
• Extent of Coverage: All lifts and escalators
</td>
</tr>
<tr>
<td>NREB 1-8 Energy Efficient Practices & Features</td>
<td>1 point for every 0.2% replacement of electricity by renewable / clean energy (Up to 10 Bonus Points)</td>
<td>
• 1 point for computation of the energy consumption in the form of energy efficiency index (EEI)
• 0.5 point for each product certified by approved local certification body (up to 2 points)
• 2 points for every 1% energy saving over the total building energy consumption (up to 9 points)
</td>
</tr>
<tr>
<td>NREB 1-9 Energy Policy & Management</td>
<td>
• 1 point for setting energy policy, energy targets and regular review with top management's commitment as part of an environmental strategy
• 2 points to show intent, measures and implementation strategies of energy efficiency improvement plans to achieve energy target set over the next three years.
</td>
<td>
• 0.5 point for setting energy policy, energy targets and regular review with top management's commitment as part of an environmental strategy
• 0.5 point to show intent, measures and implementation strategies of energy efficiency improvement plans to achieve energy target set over the next three years.
</td>
</tr>
<tr>
<td>NREB 1-10 Renewable Energy</td>
<td>Include in the Energy Efficient Practices & Features criterion</td>
<td>
<table>
<tr><th rowspan="2">Energy Efficiency Index (EEI)</th><th colspan="2">Every 1% replacement of electricity (based on total electricity consumption) by renewable energy source</th></tr>
<tr><th>Include tenant's usage</th><th>Exclude tenant's usage</th></tr>
<tr><td>≥ 50 kW//m²/yr</td><td>5 points</td><td>3 points</td></tr>
<tr><td>< 50 kW//m²/yr</td><td>3 points</td><td>1.5 points</td></tr>
</table>
</td>
</tr>
</table>

Part 2 – Water Efficiency		
Criteria	Version 2.1	Version 3.0
NREB 2-1 Water Monitoring	-	• 1 point for monitoring the water consumption on monthly basis
NREB 2-2 Water Efficient Fittings	• 6 points for having PUB Water-Efficient Building Certificate • 6 points for "Very Good" WELS rating fittings or adopt equivalent water efficient flow-rate/flush volumes for water fittings • 9 points for "Excellent" WELS rating fittings or adopt equivalent water efficient flow-rate/flush volumes for water fittings • Use of dual flushing low capacity flushing systems under WELS: Good – 1 point Very Good – 2 points Excellent – 3 points	• 9 points for having PUB Water-Efficient Building Certificate • 9 points for "Very Good" WELS rating fittings or adopt equivalent water efficient flow-rate/flush volumes for water fittings • 12 points for "Excellent" WELS rating fittings or adopt equivalent water efficient flow-rate/flush volumes for water fittings
NREB 2-3 Alternative Water Sources	Points awarded based on % reduction in potable water usage of the applicable uses > 50 % - 2 points < 10 % to 50 % - 1 point < 10 % - 0.5 point	Points awarded based on % reduction in potable water usage of the applicable uses > 50 % - 3 points < 10 % to 50 % - 2 points < 10 % - 1 point
NREB 2-5 Irrigation System and Landscaping	-	• 1 point for use of automatic water efficient irrigation system with rain sensor, soil moisture sensor or equivalent control system(extent of coverage: At least 50% of the landscape areas are served by the system) • 1 point for use of drought tolerant plants that require minimal irrigation (extent of coverage: At least 50% of the landscape areas)
NREB 2-6 Cooling Towers	-	1 point for use of NEWater or on-site recycled water from approved sources

Part 3 – Sustainable Operation & Management		
Criteria	Version 2.1	Version 3.0
NREB 3-1 Building Operation & Maintenance	1 point for certified GMM or SCEM	(c) 0.5 points for certified GMFM, 1 point for certified SCEM or GMP (up to 1 point) (d) environmental management system of the building is ISO 14000 or ISO 50001 certified
NREB 3-2 Post Occupancy Evaluation	• 1 point for conducting post occupancy survey for occupant's satisfaction on energy and environmental performance: • The minimum number of people surveyed should be around 10% of total occupancy or 30 whichever is the maximum	• 2 points for conducting post occupancy survey for occupant's satisfaction on energy and environmental performance • Required number of people surveyed shall be - 10% of total occupancy and up to 100 maximum. - Minimum 5 people shall be surveyed If total occupancy is less than 50.
NREB 3-3 Waste Management	• 1 point for provision of facilities or recycling bins • 1 point for promoting and encouraging waste minimization and recycling among occupants, tenants and visitors through various avenues • 4 points for engaging the recycling company	• 2 points for provision of facilities or recycling bins • 2 points for promoting and encouraging waste minimization and recycling among occupants, tenants and visitors through various avenues • 1 point for providing the proper storage area for the recyclable waste • 2 points for quantifying and monitoring the recycling programme for continuous improvement
NREB 3-4 Sustainable Products	• 1 point for high impact item; 0.5 point for low impact item (Up to 2 points) • products that are certified under the Singapore Green Label Scheme (SGLS)	• 1 point for high impact item; 0.5 point for low impact item (up to 8 points) • environmentally friendly products that are certified by approved local certification body

NREB 3-5 Greenery	GnP = 0.5 to < 1.0 - 0.5 point GnP = 1.0 to < 1.5 - 1 point GnP = 1.5 to < 3.0 - 1.5 points GnP ≥ 3.0 - 2 points	GnP = 0.5 to < 1.0 - 1 point GnP = 1.0 to < 2 - 2 points GnP = 2 to < 3.0 - 3.5 points GnP ≥ 3.0 - 5 points For roof top greenery areas ≥20% and <50% of useable roof areas - 1 point ≥ 50% of useable roof areas - 2 points Vertical greenery areas of ≥10m2 and <50m2 - 1 point ≥ 50m2 - 2 points
NREB 3-7 Green Transport	1 point for adequate bicycles parking lots	• 1 point for provision of covered walkway to facilitate connectivity and the use of public transport • 1 point for provision of priority parking lots for hybrid/electric vehicle within the development • Up to 1 point for provision of sheltered bicycle parking lots with adequate shower and changing facilities

Part 4 – Indoor Environmental Quality		
Criteria	Version 2.1	Version 3.0
NREB 4-1 Indoor Air Quality Performance	• 1 point for having carbon monoxide monitoring in carpark areas	• 1 point for implementing effective IAQ management plan • 1 point for use of high efficiency air filter • 1 point for Room Temperature & Relative Humidity sensor display (at least 1 unit per floor) • 1 point for Additional carbon dioxide sensor display (at least 1 unit per floor)
NREB 4-2 Indoor Air Pollutants	-	• 1 point for use of low volatile organic compounds (VOC) paints certified by approved local certification body • 1 point for use of environmental friendly adhesives certified by approved local certification body
NREB 4-3 Lighting Quality	• • At least 90% of occupants are able to adjust lighting control to suit their task needs and preference Controlled by light switches - 0.5 point Controlled by task lights - 1 point	• At least 90% of occupants are able to adjust lighting control to suit their task needs and preference Controlled by light switches - 1 point Controlled by task lights - 2 point

Part 5 – Other Green Features		
Criteria	Version 2.1	Version 3.0
NREB 5-1 Green Features & Innovations	-	New inclusion • Green mark for Office Interior certificate or restaurant certificate • Green Lease • Stormwater management • Recycling of organic food waste