DESIGN REFERENCE GUIDE

Office Interior

Version 2.0

February 2023

Contents

1. **About GreenRE** 1
2. **Introduction** 2
3. **Revision Log** 2
4. **GreenRE Assessment Stages** 3
5. **GreenRE Office Interior Rating System** 4
6. **GreenRE Office Interior Rating System Scoring** 7
7. **GreenRE Office Interior Rating System Criteria** 8

1. About GreenRE

GreenRE Sdn Bhd is a wholly owned subsidiary of the Real Estate and Housing Development Association (REHDA). The GreenRE rating tool has been developed for the purposes as mentioned herein and may be subject to updating and/or modification in the future.

GreenRE Sdn Bhd
Wisma Rehda,
No.2C, Jalan SS5/6D,
47301 Petaling Jaya,
Selangor, Malaysia

2. Introduction

The GreenRE assessment scheme was established in 2013 and is a recognized green building rating system tailored for the tropical climate. GreenRE sets parameters and establishes indicators to guide the design, construction and operation of buildings towards increased energy effectiveness and enhanced environmental performance.

The intent of this Design Reference Guide for Office Interior (referred to as "this Guideline") is to establish environmentally friendly practices for the planning, design and construction of office interior, which would help to mitigate the environmental impact of building interior for new offices, existing operating offices and existing offices undergoing renovation. This tool is dedicated for office interior other than retail and hospitality.

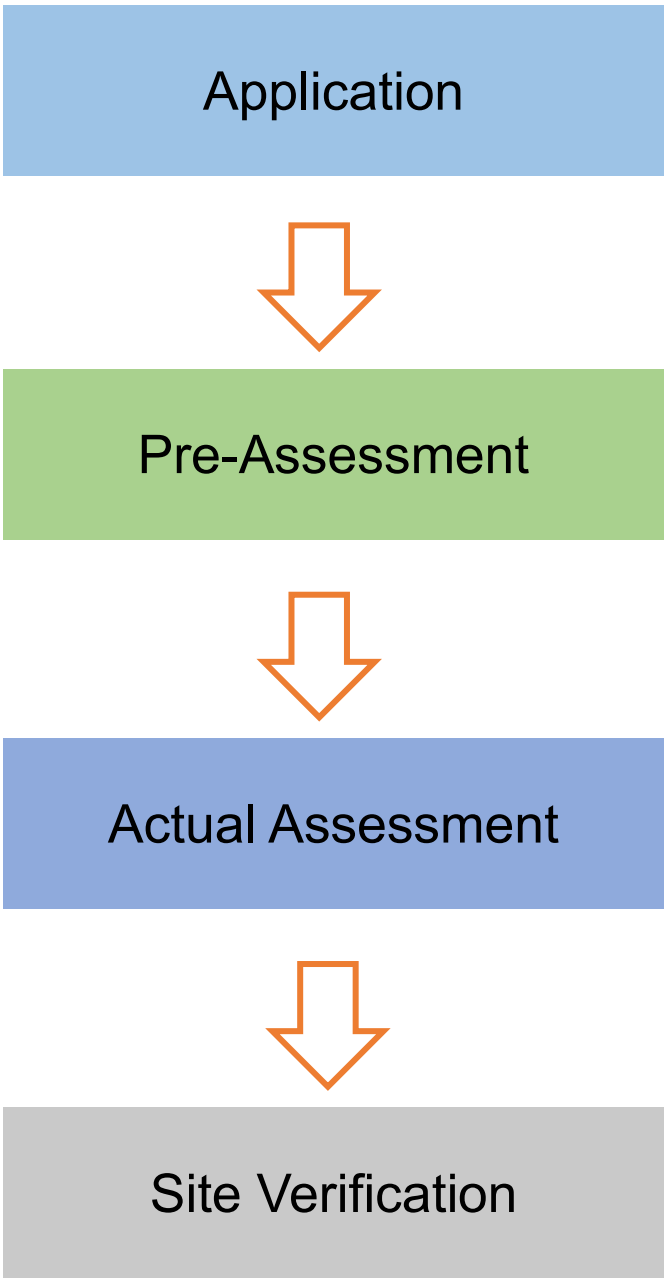
This Guideline is not intended to abridge safety, health, environmental or related requirements contained in other applicable laws, codes or policies administered by relevant authorities. Where there is a conflict between a requirement of this Guideline and such other regulations affecting the design, construction and operation of the project, the building regulations shall take precedence.

3. Revision Log

Revision	Description	Date Effective
1.0	Issued for Implementation	22nd June 2018
1.1	Issued for Implementation	March 2022
2.0	Issued for Pilot	September 2022
2.0	Issued for Implementation	February 2023

4. GreenRE Assessment Stages

The GreenRE Office Interior certification process is as follows:



Submittal of application with relevant supporting documents for certification upon strategic inception of infrastructure project.

A pre-assessment can be conducted (optional) to give the project team a better understanding of the criteria and evaluation of the certification level sought. This should be performed upon selection of suitable design option to allow teams to identify and maximise opportunities at the earliest stages of the project.

Actual assessment to be conducted once the design and documentary evidences (e.g. approved plan) are ready. After the actual assessment, our assessors will review the documents submitted.

Assessment process includes design and documentary reviews to verify if the infrastructure project meets:

(i) The intents of the criteria
(ii) The pre-requisite requirement for GreenRE Bronze, Silver, Gold and Platinum rating where applicable.

Provisional Certificate will be issued upon completion of this stage.

Site verification to be conducted upon project completion.

Final Certificate will be issued upon completion of this stage.

5. GreenRE Office Interior Rating System

Overview:

The GreenRE office interior rating system is divided into six (6) sections as follows:

Part 1 - Energy Efficiency: This category focuses on the approach that can be used in the building design and system selection to optimise the energy efficiency of buildings.

Part 2 - Water Efficiency: This category focuses on the selection of fittings and strategies enabling water use efficiency during construction and building operation.

Part 3 – Sustainable Management & Operation: This category focuses on the design, sustainable management and operation that would reduce the environmental impacts of interior.

Part 4 - Indoor Environmental Quality: This category focuses on the design strategies that would enhance the indoor environmental quality which include air quality, thermal comfort, acoustic control and daylighting.

Part 5 - Other Green Features: This category focuses on the adoption of green practices and new technologies that are innovative and have potential environmental benefits.

Part 6 - Carbon Emission of Development: This category focuses on the use of carbon calculator to calculate the carbon emission of the development.

These environment impact categories are broadly classified under two main groups namely (I) Energy Related Requirements and (II) Other Green Requirements.

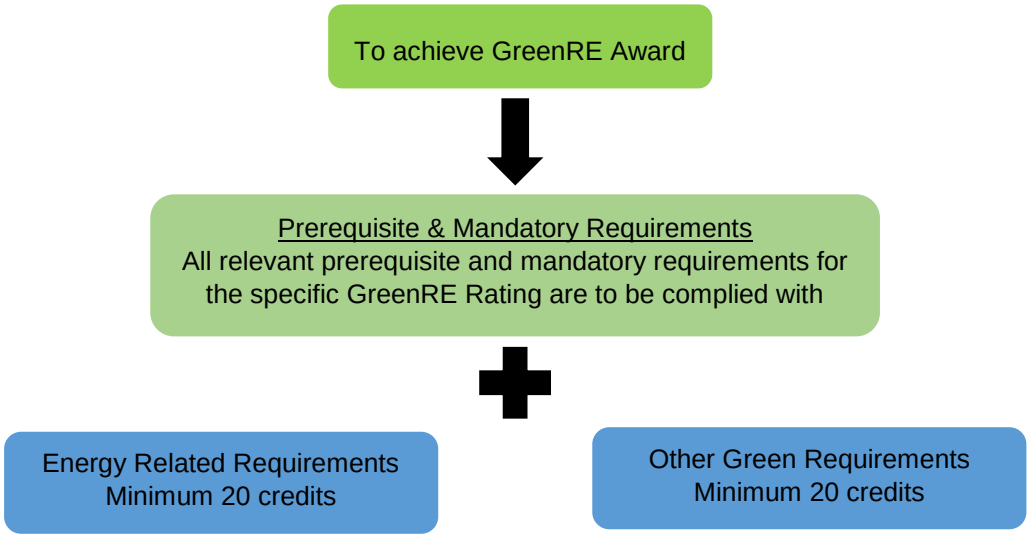
Energy Related Requirements consist of Part 1- Energy Efficiency where credits are allocated for the various energy efficient designs, practices and features used. A minimum of 20 credits must be obtained from this group to be eligible for certification.

Other Green Requirements consist of Part 2 - Water Efficiency; Part 3 - Environmental Protection; Part 4 - Indoor Environmental Quality; Part 5 - Other Green Features and Part 6 - Carbon Emission of Development. Credits are allocated for the water efficient features, environmentally friendly design practices, innovative green features used and carbon emission of development. A minimum of 20 credits must be obtained from this group to be eligible for certification.

The maximum GreenRE score achievable for a project is capped at 100 credits

This rating tool is to be read in conjunction with latest version of NRB and ENRB.

Framework:



Elective Requirement for Energy Improvement
(Combination of the following items to meet 20 credits)

Part 1 – Energy Efficiency
INT 1-1 Energy Efficiency
INT 1-2 Electricity Usage
INT 1-3 Air-Conditioning
INT 1-4 Lighting
INT 1-5 Receptacle Load Efficiency
INT 1-6 Receptacle Load Operation and Management
INT 1-7 Energy Efficient Features

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

Part 2 - Water Efficiency
INT 2-1 Water Efficient Fittings
INT 2-2 Water Usage
INT 2-3 Water Efficiency Improvement Plan

Part 3 – Sustainable Management & Operation
INT 3-1 Sustainable Office Design
INT 3-2 Sustainable Material Selection
INT 3-3 Office Operation
INT 3-4 Post Occupancy Evaluation
INT 3-5 Waste Management
INT 3-6 Green Transport Accessibility
INT 3-7 Professional Consultant

Part 4 - Work Place Health and Wellbeing
INT 4-1 Indoor Air Quality (IAQ) Performance
INT 4-2 Indoor Air Pollutants
INT 4-3 Lighting Quality
INT 4-4 Thermal Comfort
INT 4-5 Internal Noise Level
INT 4-6 Work Place Health and Wellbeing
INT 4-7 Universally Accessible Office Design

Part 5 – Other Green Features
INT 5-1 Green Features & Innovations

Part 6 – Carbon Emission of Development
INT 6-1 Carbon Emission of Development

Credit Allocation:

Category		Credits Allocation
	(I) Energy Related Requirements	
Minimum 20 credits	**Part 1: Energy Efficiency**	
	INT 1-1 Energy Efficiency	4
	INT 1-2 Electricity Usage	2
	INT 1-3 Air – Conditioning	15
	INT 1-4 Lighting	15
	INT 1-5 Receptacle Load Efficiency	10
	INT 1-6 Receptacle Load Management and Operation	2
	INT 1-7 Energy Efficient Features	8
	Category Score for Part 1 – Energy Efficiency	**56**
	(II) Other Green Requirements	
Minimum 20 credits	**Part 2: Water Efficiency**	
	INT 2-1 Water Efficiency	6
	INT 2-2 Water Usage	2
	INT 2-3 Water Efficiency Improvement Plan	1
	Category Score for Part 2 – Water Efficiency	**9**
	Part 3: Sustainable Management & Operation	
	INT 3-1 Sustainable Office Design	5
	INT 3-2 Sustainable Material Selection	12
	INT 3-3 Office Operation	3
	INT 3-4 Post Occupancy Evaluation	3
	INT 3-5 Waste Management	5
	INT 3-6 Public Transport Accessibility	2
	INT 3-7 Professional Consultants	2
	Category Score for Part 3 – Environmental Protection	**31**
	Part 4: Work Place Health and Wellbeing	
	INT 4-1 IAQ Performance	9
	INT 4-2 Indoor Air Pollutants	4
	INT 4-3 Lighting Quality	5
	INT 4-4 Thermal Comfort	2
	INT 4-5 Internal Noise Level	1
	INT 4-6 Work Place Health and Wellbeing	2
	INT 4-7 Universally Accessible Office Design	2
	Category Score for Part 4: Indoor Environmental Quality	**25**
	Part 5: Other Green Features	
	INT 5-1 Green Features & Innovations	8
	Category Score for Part 5: Other Green Features	**8**
	Part 6: Carbon Emission of Development	
	INT 6-1 Carbon Emission of Development	3
	Category Score for Part 6: Carbon Emission of Development	**3**
	Category Score for Part 2 to Part 6 – Other Green Requirements	**76**
GreenRE Non-Residential Building Score:		**133 (MAX)**

6. GreenRE Office Interior Rating System Scoring

Score	Rating
91 and above	GreenRE Platinum
81 to < 90	GreenRE Gold
71 to < 80	GreenRE Silver
50 to < 70	GreenRE Bronze

7. GreenRE Office Interior Rating System Criteria

Pre-requisites:

To be eligible for GreenRE for Office Interior, the office's temperature setting should not be lower than 23°C unless due to specific needs which will be reviewed on a case-by-case basis.

To be eligible for GreenRE certification, the office has to meet the following pre-requisite requirements:

General

- For buildings in operation for more than one (1) year, full IAQ audit to be performed once in three (3) years that complies with Code of Practice on Indoor Air Quality, Department of Occupational Safety and Health, Ministry of Human Resources Malaysia (2010) including "Guidance Note on Ventilation and Indoor Air Quality for Non-Residential setting during Covid-19 Pandemic"

For GreenRE Gold Rating

- Building Energy Intensity (BEI) of 80 Kwh/m^2/year or lower

  Note: For office where each staff is occupying office space of 12 square meter or lower, higher BEI will be considered on a case-by-case basis, but the BEI should not be more than 90 Kwh/m^2/year

- Lighting power budget of 10 W/m^2 or lower

- Setting of sustainable and environmentally friendly procurement and purchasing policy and use and purchase of sustainable and environmentally friendly products for office stationery and cleaning products

- For offices whereby air-conditioning is non-centralized (i.e. unitary systems), system efficiency shall comply with Suruhanjaya Tenaga 5-star or equivalent.

For GreenRE Platinum Rating

- Building Energy Intensity (BEI) of 70 Kwh/m^2/year or lower

  Note: For office where each staff is occupying office space of 12 square meter or lower, higher BEI will be considered on a case-by-case basis, but the BEI should not be more than 80 Kwh/m^2/year

- Lighting power budget of 8 W/m^2 or lower

- Setting of sustainable and environmentally friendly procurement and purchasing policy and use and purchase of sustainable and environmentally friendly products for office stationery and cleaning products

- For offices whereby air-conditioning is non-centralized (i.e. unitary systems), system efficiency shall comply with Suruhanjaya Tenaga 5-star or equivalent.

Note:

1. BEI calculation is based on 55 hours working week and excludes air-conditioning usage which is normally provided by landlord.

2. Office interior assessment also excludes server rooms.

Part 1 - Energy Efficiency	GreenRE Credits
INT 1-1 ENERGY EFFICIENCY (a) Encourage selection of energy efficient base building. Building is awarded GreenRE Gold / Platinum rating **OR** demonstrates 25%-30% energy savings trend over last three years. (b) Encourage office with energy efficiency improvement plan Setting target to improve office energy performance. To show intent, measures and implementation strategies of energy efficiency improvement plan over the next three years. Committed energy savings accrued from proposed measures should be quantified.	Gold: 2 credits Platinum: 3 credits 1 credit
INT 1-2 ELECTRICITY USAGE To encourage tracking of the office's energy use with data presented in a relevant manner to make occupants aware of what they are consuming and engage them to be involved in managing end-use energy consumption. a) Electrical Sub-Metering Provide private sub-meters to monitor the major energy use system in the office: • Air-conditioning / FCUs • Lighting • Plug loads Note: Energy consumption of data centres/ server rooms/ hub rooms should be separately metered for the purpose of monitoring and BEI calculation. Hence, no further point will be given for submetering of these rooms. b) Energy Portal and Dashboard • Linking the private sub-meters to the office's energy management system (either web based or mobile	1 credit 0.5 credit

application) or equivalent for purpose of trend logging and readouts
- The provision of an energy portal or dashboard in the form of digital displays in the office or on the company's intranet.

0.5 credit

INT 1-3 AIR-CONDITIONING

Encourage the use of more efficient air-conditioning to minimize energy consumption

(a) A/C system efficiency

For centralized air-conditioning systems:

Use of centralized air-conditioning system which meet the efficiency requirement as per NRB v3.1. Central plant efficiency as per adjacent table.

Note: For base building using district cooling can score full credit if air-side efficiency to meet fan power limitations stated.

Water-Cooled Chilled Water Plant Building Cooling Load (RT)		Credit
< 500	≥ 500	
Efficiency (kW/RT)		
0.85	0.75	1
0.80	0.70	2
0.75	0.68	3
0.70	0.65	4

Air-Cooled Chilled Water Plant

Building Cooling Load (RT)		Credit
< 500	≥ 500	
Efficiency (kW/RT)		
1.1	1.0	1
1.0	Not applicable	2
0.85		3
0.78		4

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

Fan System Input Power
Baseline: ASHRAE 90.1:2010 Clause 6.5.3.1 and as prescribed below;

Baseline Air Distribution System Type	Allowable Fan System Input Power	
	($kW/m^3/s$)	(W/CMH)
AHUs / FCUs ≥ 4kW (Constant Volume)	1.5	0.42
AHUs ≥ 4kW (Variable Volume)	2.1	0.58
Fan systems with nameplate motor power < 4kW	0.6	0.17

2 credits

For unitary air-conditioning systems:

Efficiency of air-conditioning system to be as per Suruhanjaya Tenaga or equivalent.

Note: This can be prescribed and enforced via DMC and green fit out guidelines to unit owner / tenant if not installed by developer.

Energy Efficiency Rating	Credit
****	3
*****	4

(up to 4 credits)

(b) Zoning and controls

Encourage the use of air-conditioning design practices that offer greater flexibility and makes it easier to serve area with different usage efficiently, such as the following:

(i) Zoning of air-conditioning system to serve areas with different usage/ occupancy needs.

1 credit

(ii) Scheduling control to switch on and/or off the air-conditioning with some localized override control where air-conditioning is needed beyond the scheduled period.

- Air-conditioning on timer control

1 credit

- Alternative cooling modes for after office hours (e.g. auxiliary air-con for selected areas only, localised cooling through fans, etc.)

1 credit

(iii) Meeting rooms, pantry, etc with specialty occupancies having controls capable of sensing space use and responding to space demand.

1 credit

(iv) Room temperature and humidity display in applicable areas

INT 1-4 LIGHTING Encourage the use of better efficient lighting to minimise energy consumption from lighting usage while maintaining proper lighting level based on the maximum lighting power density (LPD) stipulated in MS 1525: 2019.	
(a) Lighting power budget Baseline: Maximum lighting power budget and average illuminance level as per MS-1525:2019. Note: Design should include task lighting required to achieve intended lux level for workspace.	0.3 credit for every percentage improvement Credits awarded = 0.3 x (%improvement) (up to 12 credits)
(b) Lighting controls Encourage the use of lighting control circuits to minimize energy usage, such as provision of the following control strategies:	
(i) Zoning of lighting for different usage/ locations.	1 credit
(ii) Scheduling control to switch on and/or off the lightings with some localized override control where lighting is needed beyond the scheduled period.	
• Lighting on timer control/ connected to occupancy sensors	1 credit
• Toggle switch for light extension for different zones beyond pre-set period	1 credit

INT 1-5 RECEPTACLE LOAD EFFICIENCY Encourage the selection and use of energy efficient labelled office equipment to reduce the overall energy consumption. Use of energy efficient labelled office equipment (such as Energy Star, Suruhanjaya Tenaga Labelling Scheme or equivalent) to support general office function shall include but not limited to the following: • Computer • Monitor • Printer • Photocopier • TV, Projector • Microwave, portable air conditioner, mechanical fans, fridge, etc	Credits awarded based on the number (type of equipment) and energy efficiency rating (highest rating for applicable labelling scheme) of the equipment used (up to 10 credits)
INT 1-6 RECEPTACLE LOAD MANAGEMENT AND OPERATION Encourage the use of active receptacle load control strategies to minimise energy usage during operation. • Active receptacle load management based on operation schedule (automatic cut-off switches with user override) • Overnight equipment management system • Other strategies/ systems	1 credit each (Up to 2 credits)

<u>INT 1-7 ENERGY EFFICIENT FEATURES</u> Encourage the use of energy efficient features which are innovative and/or have positive environmental impact. Examples: (a) Computation of the energy consumption in the form of Building Energy Intensity (BEI) (b) Use of energy efficient features Example: • Solar panel to replace electricity • Heat recovery system • Sun pipes • Light shelves • Motion sensor/photo sensors	1 credit 2 credits for every 1% energy saving over the total office energy consumption. (Up to 8 credits)
PART 1 – ENERGY EFFICIENCY CATEGORY SCORE:	Sum of GreenRE credits obtained from INT 1-1 to 1-7

<table>
<tr><th>Part 2 – Water Efficiency</th><th>GreenRE Credits</th></tr>
<tr><td><u>INT 2-1 WATER EFFICIENT FITTINGS</u>

Encourage the use of water efficient fittings covered under the Water Efficiency Labelling Scheme (WELS) or adopt equivalent water efficient flow-rate/ flush volume for water fittings:

(a) Basin Taps and Mixers
(b) Flushing Cistern
(c) Showers
(d) Sink/Bib Taps and Mixers
(e) All other water fittings</td><td><table><tr><td colspan="3">Rating Based on Water Efficiency Products Labelling Scheme (WEPLS)</td></tr><tr><td>Efficient *</td><td>Highly Efficient **</td><td>Most Efficient ***</td></tr><tr><td>2 credits</td><td>4 credits</td><td>6 credits</td></tr></table>
Credits can be scored based on the number and water efficiency rating of the fitting type used.

(Up to 6 credits)</td></tr>
<tr><td><u>INT 2-2 WATER USAGE</u>

Facilitate continual monitoring of water use within the development through the provision of water meters for major water uses.
• Provision of local private meters for all major water uses in the office.
• Provision of leak detection system with alert features.
• Provision of smart meters for remote monitoring.
• Provision of water usage portal, dashboard or other equivalent forms that display metered data, trending of water consumption and relevant parameters which facilitate better management of water consumption during building operation.</td><td>1 credit each
(Up to 2 credits)</td></tr>
<tr><td><u>INT 2-3 WATER EFFICIENCY IMPROVEMENT PLANS</u>

Targets to improve office water performance 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.</td><td>1 credit</td></tr>
<tr><td>PART 2 – WATER EFFICIENCY CATEGORY SCORE:</td><td>Sum of GreenRE credits obtained from INT 2-1 to 2-3</td></tr>
</table>

<table>
<tr><th>Part 3 – SUSTAINABLE MANAGEMENT & OPERATION</th><th>GreenRE Credits</th></tr>
<tr><td><u>INT 3-1 SUSTAINABLE OFFICE DESIGN</u>

Encourage the selection of more sustainable base building and the adoption of office designs and materials that are environmentally friendly and sustainable.

(a) Office renovation conserves at least 25% (by area) of existing finishing for walls, flooring and ceilings

Note: Excludes painting or touching up to paint work arising from office renovation.

(b) To encourage design of open, flexible and reconfigurable layouts for maximum space usage.
• Provision of open and flexible layout with minimum enclosed space for ≥ 50% of office area
• Provision of space savers, compactors, mobile stations, etc.
• Agile working facilities (e.g. hot desking, touchdown areas, lockers for staff with no assigned desks, etc.)
• Multi-functional spaces such as pantry areas for townhall sessions, small meetings, health promoting activities (e.g. physical activity, health workshops, health screening).</td><td>Credits based on extent of retention of base building provisions
(Up to 2 credits)

<table><tr><th>Extent of conservation</th><th>Credit</th></tr><tr><td>≥25%</td><td>1 credit</td></tr><tr><td>≥50%</td><td>2 credits</td></tr></table>
1 credit each
(Up to 3 credits)</td></tr>
<tr><td><u>INT 3-2 SUSTAINABLE MATERIAL SELECTIONS</u>

Encourage the adoption of office materials that are environmentally friendly and sustainable.

(a) Retain and reuse of at least 25% (by number/ volume) of the existing furniture or use of furniture with an end-of-life take back services</td><td>Points based on extent of office furniture that is retained and/ or reused
(Up to 2 credits)</td></tr>
</table>

<table>
<tr>
<td>(b) Use of environmentally friendly products that are certified by approved local certification body.</td>
<td>
<table>
<tr><th>Extent of conservation</th><th>Credit</th></tr>
<tr><td>≥25%</td><td>1 credit</td></tr>
<tr><td>≥50%</td><td>2 credits</td></tr>
</table>
<table>
<tr><th>Extent of use of environmentally friendly product</th><th>Weightage for Credit Allocation</th></tr>
<tr><td>Low Impact</td><td>1</td></tr>
<tr><td>High Impact</td><td>2</td></tr>
</table>
Credits scored will be based on the extent of use of environmentally friendly product.

(Up to 10 credits)

Note: High impact is for products whereby quantities used by percentage is more than 50% of quantities used for same intended purpose.
</td>
</tr>
<tr>
<td><u>INT 3-3 OFFICE OPERATION</u>

(a) Commitment from tenant – environmental policy

(b) A green guide for office occupants should be disseminated. Best practices pertaining to reduction of energy use, water use and maintenance of a good indoor environment should be documented in this green guide. Evidence of office occupants' involvement in environmental sustainability should also be demonstrated.

c) Usage of sustainable fit-out materials as stipulated in the green fit-out guidelines</td>
<td>1 credit

1 credit

1 credit</td>
</tr>
<tr>
<td><u>INT 3-4 POST OCCUPANCY EVALUATION</u>

(a) Conduct yearly post occupancy evaluation to assess occupant’s satisfaction with the indoor environmental conditions.

(b) List of corrective actions taken following the post occupancy evaluation.</td>
<td>2 credits

1 credit</td>
</tr>
</table>

INT 3-5 WASTE MANAGEMENT Encourage recycling facilities within office to reduce waste going to landfill. Provision of recycling facilities (for recycling glass, paper, metal as well as one for non-recyclable waste) (i) At a central location (ii) At every floor or strategic locations to encourage recycling (iii) To Promote and encourage waste reduction and recycling among occupants, tenants and visitors. <u>a) Reduce</u> • Follow-me printing or secure printing, with printing options set to default greyscale and duplex printing • Digitalising internal processes (e.g. HR/ administrative processes, approval, claims, payments to suppliers, etc.). • Dissemination of information and circulars through emails, intranet, share point, staff notice board, etc. • Encouraging staff to bring their own electronic devices to meetings instead of printing • Others b) Reuse • Use of non-disposable cups for meetings and by staff • Use of non-disposable cutlery and crockery • Use of erroneous single sided print outs • Ordering of office supplies	0.5 credit 1 credit 0.5 credit each (up to 2 points) 0.5 credit (Up to 1.5 credits)
INT 3-6 PUBLIC TRANSPORT ACCESSIBILITY Promote the use of public transport or bicycles to reduce pollution from individual car use. (a) Good access to nearest MRT/LRT or bus stops. (<800m) (b) Adequate bicycles parking lots.	1 credit 1 credit

<u>INT 3-7 PROFESSIONAL CONSULTANTS</u> (a) Selection of a qualified design team apart from the Interiors Designers, representing the other interior fit out trades and shall consist of either of the following: i. MEP Engineers ii. C&S Engineer iii. Sustainability Consultants iv. Quantity Surveyors (b) Project team comprises one of Certified GreenRE Accredited Professional (GreenRE AP)	1 credit 1 credit
PART 3–ENVIRONMENTAL PROTECTION CATEGORY SCORE:	Sum of GreenRE credits obtained from INT 3-1 to 3-7

<table>
<tr><th>Part 4 – Workplace Health and Well Being</th><th>GreenRE Credits</th></tr>
<tr><td><u>INT 4-1 IAQ PERFORMANCE</u>

Encourage and recognize good indoor air quality (IAQ) to ensure the comfort and well-being of office occupants.

(a) IAQ Audit - to conduct a full IAQ audit that complies with Code of Practice on Indoor Air Quality, Department of Occupational Safety and Health, Ministry of Human Resources Malaysia (2010) including “Guidance Note on Ventilation and Indoor Air Quality for Non-Residential setting during Covid-19 Pandemic”

(b) Develop an active IAQ management Programme and Good Practice Guide

(c) CO2 display and monitoring to ensure delivery of sufficient /minimum outside air requirements. Indoor carbon dioxide acceptable range ≤700 ppm above outdoor concentration.

(d) Ensure compliance to Guidance Note on Ventilation and Indoor Air Quality for Non-Residential setting during Covid-19 Pandemic” for fresh air intake requirement</td><td>4 credits

1 credit

2 credits

2 credits</td></tr>
<tr><td><u>INT 4-2 INDOOR AIR POLLUTANTS</u>

Minimise airborne contaminants, mainly from inside sources to promote a healthy indoor environment.

(a) Use and purchase of low VOC and low toxicity products recognised by an approved local certification body.
Example include:

• Adhesives and sealants (including tile grouting)
• Floor coverings such as carpets, laminates and vinyl flooring (excluding tiles)
• Ceiling coverings such as ceiling boards
• Wall coverings (excluding tiles)
• Varnish, stains lacquers or other trims (including doors and furniture)</td><td>Credit scored based on % of applicable areas with such provision by category: (Up to 3 credits)

<table><tr><th>Category (for > 80% of applicable area)</th><th>Credit</th></tr><tr><td>Internal Walls</td><td>1</td></tr><tr><td>Floors</td><td>1</td></tr><tr><td>Ceilings</td><td>1</td></tr><tr><td>Doors</td><td>0.5</td></tr><tr><td>Fixed Furniture or system furniture</td><td>1</td></tr></table></td></tr>
</table>

(b) Setting of sustainable and environmentally friendly procurement and purchasing policy.	1 credit
INT 4-3 LIGHTING QUALITY To encourage good workplace lighting quality to promote productivity and comfort of occupants. (a) Design for proper lighting level. Baseline: Luminance level stated in MS 1525:2014	1 credit
(b) High frequency ballasts **OR** use of driver with output frequency < 200Hz and < 30% flicker for LED lighting.	1 credit
(c) 2 credits can be scored to encourage effective daylighting to enter occupied spaces whilst minimising heat gain and visual discomfort arising from potential glare. • Enclosed rooms located away from windows • Low workstation partition heights ≤ 1.2m from finished floor level or ≤ 0.5m from the desk plane • Perimeter lighting along windows to be interlocked with photocell sensors • Light shelf to draw daylighting deeper into the open office area • Others	*(0.5 credit each up to 2 credits)*
(d) Glare Control Potential Glare Mitigation Provision of any of the following strategies to reduce glare from windows and artificial lighting • Diffused overhead lighting • Use of light colour and matte finishes • Operable window blinds and screens • Glazing treatments/ Solar films • Workstation design to avoid glare (e.g. reduced reflective surfaces, adjustable height for monitor screens, anti-glare filters etc.)	0.5 point each (Up to 1 point)

<table>
<tr>
<td><u>INT 4-4 THERMAL COMFORT</u>

Ensure thermal comfort of office occupants

(a) Comfort level
• Indoor operative temperature between 23ºC to 26ºC
• Relative Humidity 50% - 70%

(b) Occupants are able to control the indoor temperature by zones according to their preference and thermostat set-point does not go below 23ºC

(c) 0.5 credits if occupants have access to devices to enhance individual thermal comfort (e.g. fans)</td>
<td>1 credit

0.5 credit

0.5 credit</td>
</tr>
<tr>
<td><u>INT 4-5 INTERNAL NOISE LEVEL</u>

Occupied spaces in office are designed with good ambient sound level as follows:

<table><tr><td>Low dBA</td><td>Average dBA</td><td>High dBA</td></tr><tr><td>40</td><td>45</td><td>50</td></tr></table></td>
<td>1 credit</td>
</tr>
<tr>
<td><u>INT 4-6 WORKPLACE HEALTH AND WELLBEING</u>

To improve the nutritional value of food made available to employees on day-to-day basis.
a) Offer healthier options for catering i.e.
• Include whole-grains in all staple options
• Offer plain water as default beverage option
• Fresh fruits as an option for desserts
• Coffee and tea offered must have syrup/sugar served on the side, not pre-added
• Limit deep fried items (less than 10% of catered food items)

c) Pantries and vending machines offer healthier snacks and drinks
• Healthier Choice Symbol products
• Unsweetened drinks</td>
<td>1 credit if all 5 criteria are met for at least one event in the last 3 months

1 credit</td>
</tr>
</table>

INT 4-7 UNIVERSALLY ACCESSIBLE OFFICE DESIGN Office design must cater to the needs of general users as well as special user groups who could visit or work there (e.g. Expectant Mothers, Mature workers, physically challenged employees). Incorporating universal design concepts within office space such as: • At least one automated door at accessible entrance for ease of access to office space • Stable, firm and slip-resistant walking surfaces at areas with high usage (e.g. walkways, toilets, pantries, staircases) • Main circulation routes and corridors with minimum width of 1800mm to allow one wheelchair and one person to pass each other comfortably • Provision of wheelchair-friendly toilets equipped with grab bars and emergency call bells • Provision of Nursing Rooms equipped with seating, power socket, countertop with wash basin and refrigerator • Access to assistive technology (mobility, visual, hearing)	0.5 credit each (Up to 2 credits)
Part 4 – INDOOR ENVIRONMENTAL QUALITY CATEGORY SCORE:	Sum of GreenRE credits obtained from INT4-1 to 4-7

Part 5 – Other Green Features	GreenRE Credits
INT 5-1 GREEN FEATURES & INNOVATIONS Encourage the use of other green features which are innovative and/or have positive environmental impact. Examples: • Use of printing access through swipe access card to help minimize unnecessary printing. • Provision of internal staircase to discourage usage of lifts. • Use of non-disposable cups for meetings and staff. • Provision of green walls. • Use of tele-conferencing to reduce travelling needs. • Promotion of green & health-related activities • Green and Health Education	2 credits for high impact 1 credit for low impact (Up to 8 credits)
PART 5 – OTHER GREEN FEATURES CATEGORY SCORE:	Sum of GreenRE credits obtained from INT5-1

Part 6 - Carbon Footprint of Development	GreenRE Credits
INT 6-1 CARBON FOOTPRINT OF DEVELOPMENT (a) Recognise the carbon emission based on operational carbon footprint computation of the building comprising energy and water consumption	1 credit
(b) To identify carbon debt and quantify environmental impact and embodied energy.	0.25 credits for every material declared up to 2 credits (Finishes, raw renovation material).
PART 6 - CARBON FOOTPRINT OF DEVELOPMENT **CATEGORY SCORE:**	Sum of GreenRE credits obtained from INT6-1

GreenRE Score (Office Interior)

GreenRE Score (INT) = ∑Category score [(Part 1-Energy Efficiency) +
(Part 2-Water Efficiency) +
(Part 3-Sustainable Management & Operation) +
(Part 4-Indoor Environmental Quality) +
(Part 5-Other Green Features) +
(Part 6-Carbon Emission of Development)]

Where:
Category Score for Part 1≥ 20 credits and
∑Category score for Part 2 to Part 6 ≥ 20 credits

(I) Energy Related Requirements

Part 1- Energy Efficiency

INT 1-1 Energy Efficiency
INT 1-2 Electricity Usage
INT 1-3 Air-Conditioning
INT 1-4 Lighting
INT 1-5 Office Equipment
INT 1-6 Energy Efficient Features

INT 1-1 ENERGY EFFICIENCY

Objectives	Encourage selection of energy efficient base building.
Applicability	-
Baseline Standard	-
Requirements	(a) Up to 3 credits for Interior office located in the GreenRE Gold/Platinum building **OR** the base building needs to demonstrate 25% -30% energy saving trend over last three year. All major load (Mechanical, Lighting, receptacle load, etc) need to be broke down through the submeter reading. Any green building certification equivalent rating: Gold base building - 2 credits Platinum base building – 3 credits (b) 1 credit for encouraging office with energy efficiency improvement plan Note: Setting target to improve office energy performance. To show intent, measures and implementation strategies of energy efficiency improvement plans over the next three years. Committed energy savings accrued from proposed measures should be quantified.
Documentary Evidences	<u>For 1-1(a)</u> • Copy of certificate of the base building showing the base building is certified as Gold/Platinum and the certification is still valid to the date of submission. • Copy of rental/ tenancy document of the office unit from building owner/management. (If applicable) • Energy monitoring report showing base building achieving 25%-30% energy saving trends for the past 3 years. <u>For 1-1(b)</u> • Draft of improvement plans showing the calculation of energy saving that can be achieved over the next three years. • Energy policy showing energy saving intent, measures and implementation commitments from the management.
References	-

INT 1-2 ELECTRICITY USAGE

Objectives	To encourage tracking of the office's energy use with data presented in a relevant manner to make occupants aware of what they are consuming and engage them to be involved in managing end-use energy consumption.
Applicability	Applicable to all major energy consumption within office interior.
Baseline Standard	-
Requirements	Provision of private sub-meters to monitor the major energy use system in the office such as but not limited to: • Air-conditioning / FCUs • Lighting • Plug loads
Documentary Evidences	• Provision of separate energy meter with wiring circuit for energy consumption loads for each major energy use such as air-conditioning, lightings and receptacles usage monitoring • Wiring circuit showing the location of the energy meter
References	-

INT 1-3 AIR-CONDITIONING

<table>
<tr><td>Objectives</td><td>Encourage the use of more efficient air-conditioning to minimize energy consumption</td></tr>
<tr><td>Applicability</td><td>-</td></tr>
<tr><td>Baseline Standard</td><td>MS 1525:2019 –Energy Efficiency and Use of Renewable Energy for Non-Residential Building – Code of Practice</td></tr>
<tr><td>Requirements</td><td>(a) A/C system efficiency

For centralized air-conditioning systems:

Use of centralized air-conditioning system which meet the efficiency requirement as per NRB v3.1. Central plant efficiency as per below table:

<u>Air cooled Chilled Water Plant</u>

<table>
<tr><th colspan="2">Cooling Load (RT)</th><th rowspan="3">Credit</th></tr>
<tr><th>< 500</th><th>≥ 500</th></tr>
<tr><th colspan="2">Efficiency (kW/RT)</th></tr>
<tr><td>0.85</td><td>0.75</td><td>1</td></tr>
<tr><td>0.80</td><td>0.70</td><td>2</td></tr>
<tr><td>0.75</td><td>0.68</td><td>3</td></tr>
<tr><td>0.70</td><td>0.65</td><td>4</td></tr>
</table>

<u>Air cooled Chilled Water Plant</u>

<table>
<tr><th colspan="2">Building Cooling Load (RT)</th><th rowspan="3">Credit</th></tr>
<tr><th>< 500</th><th>≥ 500</th></tr>
<tr><th colspan="2">Efficiency (kW/RT)</th></tr>
<tr><td>1.1</td><td>1.0</td><td>1</td></tr>
<tr><td>1.0</td><td rowspan="3">Not applicable</td><td>2</td></tr>
<tr><td>0.85</td><td>3</td></tr>
<tr><td>0.78</td><td>4</td></tr>
</table>
</td></tr>
</table>

And air-side efficiency to meet fan power limitations stated.

Note: For base building using district cooling can score full credit if air-side efficiency to meet fan power limitations stated.

Baseline Air Distribution System Type	Allowable Fan System Input Power	
	($kW/m^3/s$)	(W/CMH)
AHUs / FCUs ≥ 4kW (Constant Volume)	1.5	0.42
AHUs ≥ 4kW (Variable Volume)	2.1	0.58
Fan systems with nameplate motor power < 4kW	0.6	0.17

For unitary air conditioning system;

Energy Efficiency Rating	Credit
****	3
*****	4

Efficiency of air-conditioning system to be as per Suruhanjaya Tenaga or equivalent.

Note (1): Where there is a combination of centralised air-conditioned system with unitary air-conditioned system, the computation for the credits scored will be pro-rated based on the air-conditioning system aggregate capacity.

(b) Zoning & Control

Up to 5 credits for encouraging the use of air-conditioning design practices that offer greater flexibility and makes it easier to serve area with different usage efficiently, such as the following:

i. 1 credit for provision of zoning of air-conditioning system to serve areas with different usage occupancy needs.
ii. 2 credits for scheduling control to switch on and/or off the air-conditioning with some localized override control where air conditioning is needed beyond the scheduled period.
iii. 1 credit for Meeting rooms, pantry, etc with specialty occupancies having controls capable of sensing space use and responding to space demand. (Active sensor. Thermostat not acceptable)

	iv. 1 credit for provision of room temperature and humidity display in applicable areas
Documentary Evidences	For 1-3(a) • Detailed calculations of the overall improvement in equipment/system efficiency of the air-conditioning plants/ showing the design cooling system capacity and the system efficiency (including individual equipment efficiency). • Calculation and technical data of the designed system efficiency of chillers at part load condition. • Technical product information of all air-conditioning and system which included chillers, chilled water pumps, condenser water pumps, cooling towers. • Extracts of the tender specification showing the provision of the energy efficient with 3 or 4 stars rated as per Suruhanjaya Tenaga (or equivalent) for all air-conditioning unit. • Technical specification and information of the air-conditioning system. • Schematic drawings showing the air-conditioning system For 1-3(b)(i) • Schedules of the zoning area with its usage and occupancy needs. • AHUs and FCUs or unitary air conditioning system schedule and schematic drawing • Building layout with demarcation of each zoning and all spaces covered. For 1-3(b)(ii) • Extracts of the tender specification showing the provision of timer or any other schedule control system with override control installed for all air-cond areas. • Extract of the tender specification showing the provision of alternative cooling modes for after office hour (auxiliary air-cond, fans, etc). • Schematic drawing showing the schedule control system for the air-conditioning system. • Building layout with demarcation of areas with schedule controlling system. • Building layout with location demarcation of the alternative cooling modes • Technical specification and catalogue of the schedule control system • Technical specification and catalogue of the alternative cooling modes For 1-3(b)(iii) • Extracts of the tender specification showing the provision of sensor for all areas. • Schematic drawing showing the sensor for the air-conditioning system. • Building layout with demarcation of areas with sensor. • Technical specification and catalogue of the sensor.

	<u>For 1-3(b)(iv)</u> • Extracts of the tender specification showing the requirements to provide the room temperature and humidity display. • Plan layout showing the location of the room temperature and humidity display.
References	-

INT 1-4 LIGHTING

<table>
<tr><td>Objectives</td><td>Encourage the use of better efficient lighting to minimise energy consumption from lighting usage while maintaining proper lighting level.</td></tr>
<tr><td>Applicability</td><td>Applicable to lighting provisions that designed in accordance to the luminance level as recommended in MS 1525:2019.</td></tr>
<tr><td>Baseline Standard</td><td>Luminance level stated in MS 1525:2019 –Energy Efficiency and Use of Renewable Energy for Non-Residential Building – Code of Practice

ASHRAE Standard 90.1-2010</td></tr>
<tr><td>Requirements</td><td>For 1-4(a)
Up to 12 credits can be scored for the improvement in the lighting power budget in office area and common areas.

0.3 credits for every percentage improvement in the lighting power budget over the baseline standard. That is:

Credits scored = 0.3 x (% improvement)

Please refer to Table 15 in MS 1525:2019 for maximum lighting power budget (intensity) according to type of usage. Below are some examples:

Table 1-4.1: Lighting power budget
<table><tr><th>Type of usage</th><th>Maximum Lighting Power Budget (W/m^2)</th></tr><tr><td>Stairs</td><td>5</td></tr><tr><td>Inquiry desk/Waiting area</td><td>5</td></tr><tr><td>Corridors</td><td>5</td></tr><tr><td>Lobbies</td><td>5</td></tr><tr><td>Toilets</td><td>6</td></tr><tr><td>Gymnasium (Exercise area)</td><td>10.8</td></tr><tr><td>General Offices</td><td>12</td></tr></table>
For 1-4(b)
i. 1 credit for zoning of lighting for different usage/locations.

ii. 2 credits for scheduling control to switch on and/or off the lightings with some localized override control where lighting is needed beyond the scheduled period.</td></tr>
</table>

Documentary Evidences	<u>For 1-4(a)</u> • Lighting layout plan. • Lighting schedules showing the numbers, locations and types of luminaries used. • Calculation of the proposed lighting power budget and the percentage of improvement in the prescribed tabulated format shown in NRB Table 1-6-1 and 2. • Extract tender specification of lighting fittings used. • Technical product information of the lighting luminaries used. • Lux simulation result for all the spaces showing compliance with illuminance level in table 10, MS1525:2019 <u>For 1-4(b)(i)</u> • Schedules of the zoning area with its usage and occupancy needs. • Lighting schedules showing the numbers, locations and types of luminaries used for each zoning. • Building layout with demarcation of each zoning and the spaces covered. <u>For 1-4(b)(ii)</u> • Extracts of the tender specification showing the provision of timer or any other schedule control system with override control installed for all lighting zones applicable. • Schematic drawing showing the schedule control system for the lighting zones applicable. • Building layout with demarcation of areas with schedule controlling system. • Technical specification and catalogue of the schedule control system
References	MS 1525:2019 –Energy Efficiency and Use of Renewable Energy for Non Residential Building - Code of Practice ASHRAE Standard 90.1-2010

INT 1-5 RECEPTACLE LOAD EFFICIENCY

Objectives	Encourage the selection and use of energy efficient labelled office equipment to reduce the overall energy consumption.
Applicability	Applicable to all office equipment
Baseline Standard	-
Requirements	Up to 10 credits credit for the use of energy efficient office equipment or products that are certified by approved local/international certification body for at least 90% of each equipment by type or products • Computer • Monitor • Printer • Photocopier • TV, Projector • Microwave, Mechanical fans, fridge, etc Credits awarded based on the number (type of equipment) and energy efficiency rating (highest rating for applicable labelling scheme) of the equipment used
Documentary Evidences	• Extracts of the tender specification showing the provision of the proposed energy efficient office equipment and the extent of implementation where applicable. • Technical product information on the energy efficient products used. • List of energy efficient office equipment showing the quantities and types of equipment • Drawing showing the location for the provision of all intended devices • Energy efficiency certificate for all equipment
References	Energy Star, Suruhanjaya Tenaga (ST)

INT 1-6 RECEPTACLE LOAD MANAGEMENT AND OPERATION

Objectives	Encourage the use of active receptacle load control strategies to minimise energy usage during operation.
Applicability	Applicable to all plug load within the office boundary.
Baseline Standard	-
Requirements	Up to 2 credits are credited for the use of active plug load control strategies to minimise energy usage during operation. • Active plug load management based on operation schedule (automatic cut-off switches with user override) • Overnight equipment management system • Other strategies/ systems
Documentary Evidences	• Extracts of the tender specification showing the provision of active plug load control strategies with user override • Technical product information on the active plug load control • List of application area and mode of control • Drawing showing the location for the provision of all intended devices • Write up details on how the active plug load control system works and input in the office user guideline for occupant reference.
References	-

INT 1-7 ENERGY EFFICIENT FEATURES

Objectives	Encourage the use of energy efficient features which are innovative and/or have positive environmental impact
Applicability	Applicable to office interior
Baseline Standard	
Requirements	For 1-7 (a) 1 credit can be scored for the practice of using Building Energy Intensity (BEI) as an office performance indicator to measure the office's unit area energy consumption for future monitoring and improvements. Calculation of BEI: BEI = [(TBEC – CPEC) / (GFA excluding carpark - GLA x FVR) x (NF/OH) Where: (a) TBEC = Total building energy consumption (kWh/year) (b) CPEC = Car Park Energy Consumption in (kWh/year) (c) GFA = Gross Floor Area (exclude car park area) (m^2) (d) GLA = Gross Lettable Area (m^2) (e) FVR = Floor Vacancy Rate (NLA) (m^2) (f) NF = Normalizing factor based on a typical weekly operating hour that is 52 Hrs/week [only for office category] (g) OH = Weighted weekly operating hours (hrs/week) [only for office category] Note: (1) BEI is based on 100% occupancy rate for consistency. (2) All major energy consumption equipment's are to be included in the estimation of total office energy consumption. For 1-7 Up to 8 credits can be scored for the use of the following approved energy efficient features depending on the potential energy saving. • Solar panel to replace electricity • Heat recovery system • Sun pipes • Light shelves • Motion sensor/photo sensors Extent of coverage: 2 credits for every 1% energy saving over the total office energy consumption Note: For features that are not listed NRB 1-7 above, the QP is required to submit the details showing the positive environmental impacts and potential energy savings of the proposed features to GreenRE assessment

<table>
<tr><td>Documentary Evidences</td><td>

Extracts of the tender specification showing the provision of the proposed energy efficient features and the extent of implementation where applicable.
Technical product information and related drawing on the energy efficient features used.
Calculation of the percentage energy saving that could be reaped from the use of these features.
Calculation for itemized major energy consumption item for the office area.
Technical specification of each itemized major energy consumption items

</td></tr>
<tr><td>References</td><td>-</td></tr>
<tr><td>Work example</td><td>
<u>For 1-7 (a)</u>
(1) Determine the total annual office electricity consumption based on the estimated electricity consumption and usage pattern in term of operation hours of all major energy consumption systems and equipment.
(2) Compute the BEI of the office

Background info:
Assume a proposed office unit with GFA of 5000 m^2, operational hours per week is 45 hours at 100% occupancy rate.

Table 1-7.1: Total Office Electricity Consumption per year
<table>
<tr><th>System/Equipment</th><th>Total Annual Electricity Consumption (kWh/year)</th></tr>
<tr><td>Lighting</td><td>18554.2</td></tr>
<tr><td>Exterior Lighting (signboard)</td><td>145.52</td></tr>
<tr><td>Unitary Air Conditioning System</td><td>267636</td></tr>
<tr><td>Receptacle Equipment</td><td>80</td></tr>
<tr><td>Total</td><td>286415.72</td></tr>
</table>
*For specialised area within the office, the nominal values shown in the following table can be adopted.

<table>
<tr><th>Receptacle Loads</th><th>Nominal Values</th></tr>
<tr><td>Computer intensive offices</td><td>22 W/m^2</td></tr>
<tr><td>General office</td><td>16 W/m^2</td></tr>
<tr><td>Large conference area</td><td>11 W/m^2</td></tr>
<tr><td>Server/Computer rooms</td><td>540 W/m^2</td></tr>
</table>
Source: ASHRAE Standard 90.1:2010
</td></tr>
</table>

	Total annual office electricity consumption (TOEC) = 286,415.72 kWh/year Therefore, the BEI of the office is as follows: BEI = (TOEC / GFA) X (55 / WOH) = (286,415.72 /5000) X (55/45) =70 kWh/m^2/year Credit scored for 1-7 (a) = 1 credit For 1-7 (b) The same proposed office has included the use of motion sensors for pantry and meeting/discussion rooms. (i) Pantry Total light fittings to be controlled by motion sensors = 2 x 10 nos. Power consumption by light fitting = 2 x 10 x 12 W = 240 W Assume 5 hours per day that the light fittings are off when it is not occupied. Electricity saving = 240 W x 5 hours = 1.2 kWh Annual electricity saving = 1.2 x 365 = 438 kWh (ii) Meeting/Discussion Rooms Total light fittings to be controlled by motion sensors = 2 x 100 nos. Power consumption by light fitting = 2 x 100 x 24 W = 4800 W Assume 2 hours per day that the light fittings are off when it is not used Electricity saving = 4800 W x 2 hours = 9.6 kWh Annual electricity saving = 9.6 x 365 = 3504 kWh Total annual electricity saving using motion sensors = 438+3054 = 3942 kWh % Energy savings = 3942/18554.2 = 21% Credits scored for 1-10(c) = 2 credits for every 1% energy saving = 2 x 21% = 42, *capped at 8 credits

Part 2- Water Efficiency	INT 2-1 Water Efficient Fittings INT 2-2 Water Usage INT 2-3 Water Efficiency Improvement Plan

INT 2-1 WATER EFFICIENT FITTINGS

<table>
<tr><td>Objectives</td><td>Reduce to use of potable water by using water efficient fittings covered under the Water Efficiency Products Labelling Scheme (WEPLS)</td></tr>
<tr><td>Applicability</td><td>Applicable if the area such as pantry and toilets be part of the office owner responsibility for future monitoring and maintenance purposes</td></tr>
<tr><td>Baseline Standard</td><td>As specified under Water Efficiency Products Labelling Scheme (WEPLS) to all water fittings as follows:
Basin taps and mixers
Sink/taps and mixers
Dual Flush Low-Capacity Flushing Cisterns
Showerheads
Shower taps and mixers
Urinals and Flush Valves</td></tr>
<tr><td>Requirements</td><td>Up to 6 credits can be scored based on the number and water efficiency rating of the fitting type used.

<table><tr><th colspan="3">Rating Based on Water Efficiency Products Labelling Scheme (WEPLS)</th></tr><tr><td>Efficient *</td><td>Highly Efficient **</td><td>Most Efficient ***</td></tr><tr><td>2 credits</td><td>4 credits</td><td>6 credits</td></tr></table></td></tr>
<tr><td>Documentary Evidences</td><td>Extracts of the tender specification showing all the water fitting provisions for the development.
Water fitting schedules showing the numbers, types and the approved rating of the proposed fittings in the prescribed tabulated format shown in the Table 2-1.1.
Schematic drawing of cold water and sanitary plumbing.
WEPLS product specification or certificate. In the event no product recognition from WEPLS, product catalogue and test report from local or international body that equivalent to the SIRIM standard of testing is required.</td></tr>
<tr><td>References</td><td>For more information about WEPLS, refer to
http://www.span.gov.my/index.php?option=com_content&view=article&id=580%3Aabout-us1&catid=175%3Awepls&Itemid=457&lang=en</td></tr>
</table>

Work example

Example of a water fitting schedule showing the numbers, types and the approve rating of the proposed fitting for an office interior as in Table 2-1.1

Table 2-1.1: Computation of the percentage of water fittings

Ref.	Water Fitting Type	WEPLS rating			Not Rated	Total
		Efficient	Highly Efficient	Most Efficient		
1	Shower taps and mixers	0	45	0	0	45
2	Basin taps and mixers	0	0	55	0	55
3	Sink/bib taps and mixers	0	70	0	0	70
4	Flushing cisterns	0	0	50	0	50
5	Others - Urinals	0	0	0	5	5
Total no. based on rating (A)		0	115	105	5	∑A = 225
Weightage (B)		2	4	6	0	
Total (AxB)		0	460	630	0	∑(AxB) = 1090

Credits scored = ∑ (A x B) / ∑A

= 1090 / 225

= 4.84 credits

INT 2-2 WATER USAGE

Objectives	Promote continual monitoring of water use within the development through the provision of water meters for major water uses.
Applicability	Applicable to sub-metering provisions for major water uses for office
Baseline Standard	-
Requirements	1 credit can be scored and up to 2 credits can be scored if: • Provision of local private meters for all major water uses in the office. • Provision of leak detection system with alert features. • Provision of smart meters for remote monitoring. • Provision of water usage portal, dashboard or other equivalent forms that display metered data, trending of water consumption and relevant parameters which facilitate better management of water consumption during building operation.
Documentary Evidences	• Extracts from the tender specification stating the locations and provision of sub meters for all major water uses. • List of a submeter and its location. • Schematic drawings of cold-water distribution system showing the location of the sub meters provided. • Extract of tender specification showing the provision of leak detection system with alert features • Schematic drawing of the system tapping • Technical spec and catalogue of the leak detection system • Extracts from the tender specification showing the requirement of water usage portal, dashboard or other equivalent forms that display metered data, trending water consumption and relevant parameter. • Sample screenshot of the portal showing all the parameters
References	-

INT 2-3 WATER EFFICIENCY IMPROVEMENT PLAN

Objectives	To show intent, measures and implementation strategies of water efficiency improvement plans over the next three years
Applicability	Generally applicable for water consumption and its cycle for non-domestic used
Baseline Standard	-
Requirements	1 credit can be scored for the commitment to plan water savings accrued from proposed measures should be quantified.
Documentary Evidences	• Improvement plans showing the calculation of water saving that can be achieved. • Water efficiency management plan report
References	-

Part 3 – Sustainable Operation & Management	INT 3-1 Sustainable Office Design INT 3-2 Sustainable Material Selection INT 3-3 Office Operation INT 3-4 Post Occupancy Evaluation INT 3-5 Waste Management INT 3-6 Greenery INT 3-7 Green Transport Accessibility INT 3-8 Professional Consultant

NRB 3-1SUSTAINABLE OFFICE DESIGN

Objectives	Encourage the selection of more sustainable base building and the adoption of office designs and materials that are environmentally friendly and sustainable
Applicability	Applicable for office building layout
Baseline Standard	-
Requirements	3-1(a) 2 credits for the office renovation conserves at least 50% (by area) of the existing finishing for walls, flooring and ceilings *Note: Excludes painting or touching up to paint work arising from office renovation.* 3-1(b) Up to 3 credits for the office layout design encourages open, flexible and maximal space usage such as follow: (i) 1 credit for the provision of open and flexible layout with minimum enclosed space. (Overall office layout) (ii) 1 credit for the provision of space saver, mobile station (Furniture & Fittings), etc. (iii) 1 credit for the layout encourages external views. Demonstrate that ≥ 75% of all working spaces have a direct line of sight through vision indoor and outdoor glazing at a height of 1.2m from floor level
Documentary Evidences	<u>For 3-1(a)</u> • Architectural base-building floor plan showing the existing walls, flooring and ceiling area • Approved internal design or drawing of renovation works with conservation area for at least 50% of the existing finishing for walls, flooring and ceilings <u>3-1(b)</u> • Extract of tender specification showing the requirements to adopt flexible layout and maximum space usage. • Relevant drawings showing the space setting including partition and furniture.
References	-

INT 3-2 SUSTAINABLE MATERIAL SELECTIONS

<table>
<tr><td>Objectives</td><td>Encourage the adoption of office materials that are environmentally friendly and sustainable</td></tr>
<tr><td>Applicability</td><td>Applicable to non-structural material and functional space in the office interior</td></tr>
<tr><td>Baseline Standard</td><td>-</td></tr>
<tr><td>Requirements</td><td>3-2(a) 2 credits for maintaining at least 50% (by volume) of the existing furniture

3-2(b) Up to 10 credits are allocated to encourage the use of environmentally friendly products that are certified by approved local/international certification body. The criterion is only applicable for non-structural building components and functional spaces. Credits scored will be based on the extent of use of environmentally friendly product.

The environmentally friendly product proposed must be approved by a valid international or local certification body and is subject to GreenRE's evaluation.

Table 3-2.1: Weightage for credits allocation
<table><tr><th>Extent of use of environmentally friendly product</th><th>Weightage for Credits Allocation</th></tr><tr><td>Low impact</td><td>1.0</td></tr><tr><td>High Impact</td><td>2.0</td></tr></table>
The use of environmentally friendly products or recycled materials used for all main office space will be considered as <u>high impact</u> (2 credits) on condition that quantities used by percentage are more than 50% (i.e. extent of coverage as compared to total quantities used for same intended purpose.) If less than 50% it will be considered as low impact 1 credit.

Notes:
(1) Same type of the product not allowed to be double claimed for different area of application
(2) The credit allocated for low VOC paints, adhesives, cleaning products and flooring/carpeting certified by approved local certification body can be found in INT 4-2 and hence shall not be included in the scoring for INT 3-2</td></tr>
<tr><td>Documentary Evidences</td><td>• Extracts from the tender specification and drawings showing the requirements to incorporate the environmentally friendly products that are certified and approved by local/international certification body.
• Certification details from approved local/international certification body such as the material certification standards and rating within validity period.
• Technical product information on the sustainable products.
• Calculation of products and application area
• Finishing schedule or material approval for the product use</td></tr>
<tr><td>References</td><td>SGLS, SGBC, SIRIM, myHijau</td></tr>
</table>

Work Example

Determine if the environmentally friendly products selected are certified with approved local/international certification body. Check if can be considered high impact or low impact based on the percentage of coverage

Note: Certain products can have more environmentally friendly features than others. Other than recycled materials, they may have features like low VOC assembly or manufactured with resource efficient processes, durability etc that will render the products more environmentally friendly than others. If the certified products selected are more environmentally friendly and are given a better rating by the approved local/international certification body, a higher weightage can be considered in credit scoring.

Example of a proposed development with the following provisions:

(a) Use of panel boards as internal partitions for more than 50% of the office spaces and the product is rated by an approved certification body.
(b) Use of lightweight gypsum plasterboard for internal office ceiling. Product is rated by approved by international certification body.
(c) Use of blackout curtain wellness and gym rooms. Product is rated by approved international certification body.
(d) Use of wooden doors for CEO and training rooms. Product is rated by approved local certification body.

Products and application area		With approved certification	Impact	Credits scored
(a)	Internal partition for more than 50% of office spaces	Yes	High	2
(b)	Lightweight gypsum plasterboard installed for office ceiling	Yes	High	2
(c)	Blackout curtain in wellness & gym rooms	Yes	Low	1
(d)	Wooden doors for CEO & training rooms only	Yes	Low	1

Therefore, credits scored for 3-2 = 2 + 2 + 1+1 **= 6.0 credits**

INT 3-3 OFFICE OPERATION

Objectives	Encourage the adoption of environmentally friendly practices during building operation
Applicability	Applicable within office interior building
Baseline Standard	-
Requirements	3-3(a) 1 credit can be scored for the provision of environmental policy that reflects the sustainable goals set 3-3(b) 1 credit for the provision of office green guide (OGG) for office occupants should be disseminated. The provision of office green guide must detail out the environmental friendly facilities and features within the building/office and their uses in achieving the intended environment performance during building operation . 3-3(c) Provision of building user guidelines by building owner.
Documentary Evidences	<u>For 3-3 (a)</u> • Copy of Environmental policy from tenant showing the commitment towards environmental sustainability • Documentation related to the building environmental policy <u>For 3-3 (b)</u> • Evidence of office occupants' involvement in environmental sustainability should be demonstrated. • Draft of office green guide (OGG) or equivalent green document for office tenant/occupier <u>For 3-3 (c)</u> • Copy of building user guideline from building owner
References	-

INT 3-4 POST OCCUPANCY EVALUATION

Objectives	To receive feedback from occupants of the building
Applicability	Generally applicable to office building developments.
Baseline Standard	-
Requirements	3-4(a) 2 credits allocated for yearly post occupancy evaluation survey to assess occupant's satisfaction with the indoor environmental conditions. Required number of people surveyed shall be: • 10% of total occupancy and up to 100 maximums. • Minimum 5 people shall be surveyed if total occupancy is less than 50. 3-2(b) 1 credit can be scored for the list of corrective actions taken following the post evaluation.
Documentary Evidences	<u>For 3-4(a)</u> • Draft of survey form indicating indoor quality parameter such as noise level, thermal comfort, lighting, daylit provision etc • Letter of commitment to conduct the survey. <u>For 3-4(b)</u> • List of corrective action that can be taken if the feedback of the survey is not satisfying. • Evidence from past feedback that could be improved were implemented or justification of measures to be taken to improve the current situation.
References	-

INT 3-5 WASTE MANAGEMENT

Objectives	Encourage recycling facilities and waste minimisation within the occupants of the office
Applicability	Generally applicable to office interior developments.
Baseline Standard	-
Requirements	Provision of recycling facilities or recycling bins within office boundary for collection and storage of different recyclable waste such as paper, glass, plastic etc as well as one for non-recyclable waste a. 1 credit at a central location with proper storage area for recyclable waste by the base building b. 1 credit at every floor or strategic locations to encourage recycling activity c. 2 credits for the preparation and implementation of waste management improvement plan and setting targets for waste reduction.
Documentary Evidences	<u>For 3-5(a) and (b)</u> • Extracts of the tender specification showing the requirements for the provision of recycling facilities at central location or recyclable bins at strategic location • Plan layout showing the location of the recycling bins for collection and storage of different recyclable waste. • Product catalogue. <u>For 3-5(c)</u> • Waste management plan which highlighted the promotion and encouragement plan for minimization and recycling among occupants with setting target to reduce the waste
References	-

INT 3-7 PUBLIC TRANSPORT ACCESSIBILITY

Objectives	Promote environmentally friendly transport options and facilities to reduce pollution from individual car use.
Applicability	Generally applicable to all building developments.
Baseline Standard	-
Requirements	3-7(a) 1 credit can be scored for design that provides good access (<800m walking distance) to public transport networks such as MRT/LRT stations or bus stops 3-7(b) Up to 1 credit can be scored for the provision of covered/sheltered bicycles parking lots with rack / locking bar. Extent of Coverage: Bicycles parking lot: minimum 10 number and maximum 50 numbers of bicycle parking lot.
Documentary Evidences	<u>For 3-5(a)</u> • Site layout plan in the context of the surrounding area showing the location of the development site and walking path to the location of the MRT/LRT stations and bus stops not more than 800m. • Proposed bus-stop details drawing. <u>For 3-5(b)</u> • Extracts of the tender specification showing the requirement to provide covered/sheltered bicycles parking lots for the development and the total quantity of bicycles lots provided. • Base-building plan layout showing the location of the covered/sheltered bicycle parking lots and rack/locking bar.
References	-

INT 3-8 PROFESSIONAL CONSULTANTS

Objectives	Selection of a qualified design team apart from the Interiors Designers, representing the other interior fit out trades
Applicability	-
Baseline Standard	-
Requirements	3-8(a) 1 credit for selection of a qualified design team apart from the Interiors Designers, representing the other interior fit out trades and shall consist of either of the following: i. MEP Engineers ii. C&S Engineer iii. Sustainability Consultants iv. Quantity Surveyors 3-8(b) 1 credit if the project team comprises Certified GreenRE Accredited Professional (GreenRE AP)
Documentary Evidences	For 3-8(a) • Confirmation of their involvement performance in a project development such as minutes of meeting etc For 3-8(b) • A certified true copy of the certificate of GreenRE AP • Confirmation of their involvement performance in a project development such as minutes of meeting etc
References	

Part 4 – Indoor Environmental Quality	INT 4-1 Indoor Air Quality (IAQ) Performance INT 4-2 Indoor Air Pollutants INT 4-3 Lighting Quality INT 4-4 Thermal Comfort INT 4-5 Internal Noise Level INT 4-6 Work Place Health and Wellbeing

INT 4-1 INDOOR AIR QUALITY (IAQ) PERFORMANCE

<table>
<tr><td>Objectives</td><td>To promote a healthy indoor environment for occupant</td></tr>
<tr><td>Applicability</td><td>Generally applicable to all building developments (air-conditioned areas only)</td></tr>
<tr><td>Baseline Standard</td><td>Indoor Air Contaminants Parameters:
<table>
<tr><th>Physical Parameters</th><th colspan="3">Acceptable Range</th></tr>
<tr><td>Air Temperature</td><td colspan="3">23-26 °C</td></tr>
<tr><td>Relative Humidity</td><td colspan="3">50-70%</td></tr>
<tr><td>Air Movement</td><td colspan="3">0.15-0.5 m/s</td></tr>
<tr><th rowspan="2">Chemical Contaminants</th><th colspan="3">Acceptable Limits</th></tr>
<tr><th>ppm</th><th>mg/m³</th><th>Cfu/m³</th></tr>
<tr><td>Carbon Monoxide</td><td>10</td><td>-</td><td>-</td></tr>
<tr><td>Formaldehyde</td><td>0.1</td><td>-</td><td>-</td></tr>
<tr><td>Ozone</td><td>0.05</td><td>-</td><td>-</td></tr>
<tr><td>Respirable particulates</td><td>-</td><td>0.15</td><td>-</td></tr>
<tr><td>Total volatile organic compounds (TVOC)</td><td>3</td><td>-</td><td>-</td></tr>
<tr><th rowspan="2">Biological Contaminants</th><th colspan="3">Acceptable Limits</th></tr>
<tr><th>ppm</th><th>mg/m³</th><th>Cfu/m³</th></tr>
<tr><td>Total Bacteria Counts</td><td>-</td><td>-</td><td>500</td></tr>
<tr><td>Total Fungal Counts</td><td>-</td><td>-</td><td>1000</td></tr>
<tr><th rowspan="2">Ventilation Performance Indicator</th><th colspan="3">Acceptable Limits</th></tr>
<tr><th>ppm</th><th>mg/m³</th><th>Cfu/m³</th></tr>
<tr><td>Carbon Dioxide</td><td>C1000</td><td>-</td><td>-</td></tr>
</table>
Notes:

For chemical contaminants, the limits are eight-hour time-weighted average airborne concentrations.
mg/m³ is milligrams per cubic meter of air at 25° Celsius and one atmosphere pressure.
ppm is parts of vapour or gas per million parts of contaminated air by volume.
cfu/m³ is colony forming units per cubic meter.
C is the ceiling limit that shall not be exceeded at any time. Readings above 1000ppm are indication of inadequate ventilation.
Excess of bacterial counts does not necessarily imply health risk but serve as an indicator for further investigation.
</td></tr>
<tr><td>Requirements</td><td>4-1(a) Up to 5 credits will be given for conducting a full IAQ audit once every 3 years to comply with the Code of Practice on Indoor Air Quality Department of Occupational Safety and Health, Ministry of Human Resources Malaysia (2005).

Ventilation in the office Interior to comply with the requirement stipulated in the Code of Practice on Indoor Air Quality Department of Occupational Safety and Health, Ministry of Human Resources Malaysia (2005).

4-1(b) 1 credit for the implementation of effective IAQ management plan to ensure building ventilation systems are frequently maintained.</td></tr>
</table>

	4-1(c) 1 credit for additional carbon dioxide (CO_2) sensor display (at least 1 unit per floor)
Prerequisite	To conduct a full IAQ audit once every 3 years to comply with the Code of Practice on Indoor Air Quality Department of Occupational Safety and Health, Ministry of Human Resources Malaysia (2005).
Documentary Evidences	<u>For 4-1(a):</u> • Most recent IAQ audit report highlighting the parameters that contribute to indoor air quality performance. • Most recent IAQ assessment report with the results of the building air quality. • Letter of commitment to conduct IAQ assessment IF the assessment not conduct previously. <u>For 4-1(b):</u> • Provision of IAQ Management Plan which evaluates overall building ventilation system using checklist and any comparable methods. <u>For 4-1(c):</u> • Extract tender specification for the requirement • Layout plan for every floor showing the location of the carbon dioxide sensor display of the building. • Technical product specification of carbon dioxide sensor.
References	Code of Practice on Indoor Air Quality Department of Occupational Safety and Health, Ministry of Human Resources Malaysia

INT 4-2 INDOOR AIR POLLUTANTS

Objectives	Minimise airborne contaminants, mainly from inside sources to promote a healthy indoor environment.
Applicability	Generally applicable to all building developments.
Baseline Standard	-
Requirements	4-2(a) Up to 3 credits can be scored for the use of low VOC and low toxicity products recognised by approved local certification body or equivalent for at least 90% of the internal wall areas for: • Cleaning products • Carpeting/flooring • Adhesives • Paints 4-2(b) 1 credit can be scored for setting of sustainable environmental friendly procurement and purchasing policy
Documentary Evidences	For 4-2(a) • Extracts of the tender specification showing the requirement to use low VOC and low toxicity products that are certified by approved local/ international certification body or equivalent. • Product catalogue. • Green certificate with validity expiry. For 4-2(b) • Copy of sustainable and environmental-friendly procurement and purchasing policy for the operation and maintenance of the base-building
References	-

INT 4-3 LIGHTING QUALITY

Objectives	Encourage good workplace lighting quality to promote productivity and comfort of occupants
Applicability	Generally applicable to workplace such as offices, classrooms and training rooms.
Baseline Standard	The minimum illuminance level for day lighting shall be in accordance with MS1525:2019
Requirements	(a) 1 credit is allocated if the lighting level comply with MS 1525:2019 (b) 1 credit can be scored for the use of high frequency ballasts in the fluorescent luminaries if it is adopted in at least 90% of the applicable areas that are served by fluorescent luminaries; OR 1 credit can be scored for the use of LED driver with output frequency < 200Hz and < 30% flicker for LED lighting in at least 90% of the applicable areas served by LED lighting. (c) 3 credits can be scored to encourage effective daylighting to enter occupied spaces whilst minimising heat gain and visual discomfort arising from potential glare*. (0.5 credit each up to 2 credits)* • Enclosed rooms located away from windows • Low workstation partition heights ≤ 1.2m from finished floor level or ≤ 0.5m from the desk plane • Perimeter lighting along windows to be interlocked with photocell sensors • Light shelf to draw daylighting deeper into the open office area • Others (d) Glare Control Potential Glare Mitigation Up to 1 credit Provision of any of the following strategies to reduce glare from windows and artificial lighting (0.5 credit up to 1 credit) • Diffused overhead lighting • Use of light colour and matte finishes • Operable window blinds and screens • Glazing treatments/ Solar films • Workstation design to avoid glare (e.g. reduced reflective surfaces, adjustable height for monitor screens, anti-glare filters etc.)
Documentary Evidences	For 4-3(a) • Current lighting schedule showing lighting levels in various building areas. • Lighting layout plan. • Lux simulation showing the lighting level comply with MS1525:2019. • Technical product information of the lighting luminaries used For 4-3(b) • Extracts of the tender specification showing the requirement to have high frequency ballasts or LED driver.

	• A summary sheet listing all fluorescent and LED luminaries used for the developments. • Electrical lighting layout indicating all the fittings with high frequency ballasts or LED lighting. • Product catalogue specifying high frequency ballast for fluorescent luminaries. (if applicable) • Product catalogue specifying the LED driver with output frequency <200 Hz and <30% flicker for LED lighting. (if applicable) • Calculation showing at least 90% of the applicable areas that are served by high frequency ballast or LED lighting. <u>For 4-3(c)</u> • Architectural base-building plan layout showing glazing/window area for each habitable space. • Glaring control system that will be applied such curtain blind, tinted glazing blind etc
References	-

INT 4-4 THERMAL COMFORT

Objectives	Recognise offices that are designed with good thermal comfort
Applicability	Generally applicable to office building developments with air-conditioning systems
Baseline Standard	Indoor dry-bulb temperature between 23°C to 26°C Relatively Humidity between 50% - 70%
Requirements	4-4(a) 1 credit can be scored if the air-conditioning systems are designed to allow for cooling load variations due to fluctuations in ambient air temperature to ensure consistent indoor conditions for thermal comfort. 4-4(b) 0.5 credits can be scored occupants are able to control the indoor temperature by zones according to their preference and thermostat set-point does not go below 23ºC 4.4 (c) 0.5 credits if occupants have access to devices to enhance individual thermal comfort (e.g. fans)
Documentary Evidences	<u>For 4-1 (a)</u> • Extracts of Building User Guide (BUG) by the base building specification showing the requirement to design the air-conditioning systems which would provide consistent indoor conditions for thermal comfort. • Design brief of the air-conditioning system highlighted room temperature and humidity requirement. <u>For 4-1 (b)</u> • Extracts of the tender specification showing the requirements to provide the room temperature and humidity display. • Plan layout showing the location of the room temperature and humidity display. • Product catalogue of temperature-RH control device
References	“Code of Practice on Indoor Air Quality” (2005), Department of Occupational Safety and Health, Ministry of Human Resources Malaysia

INT 4-5 INTERNAL NOISE LEVEL

<table>
<tr><td>Objectives</td><td>Recognise buildings that are designed to consider the potential noise levels within the dwelling units are maintained at an appropriate level. All building partitions to shall be in accordance with required STC ratings.</td></tr>
<tr><td>Applicability</td><td>Generally applicable to office building developments</td></tr>
<tr><td>Baseline Standard</td><td>ASTEM E413 or equivalent</td></tr>
<tr><td>Requirements</td><td>1 credit can be scored if the building is designed to achieve ambient internal noise level as specified:
55dB (6am – 10pm) L_{Aeq}
45dB (10pm – 6 am) L_{Aeq}
This can be achieved by adhering to the following STC values for building partitions:<table><tr><th>Description</th><th>Sound Transmission Class (STC)</th></tr><tr><td>Separation between functional spaces within dwelling units and in-between adjacent dwelling units.</td><td>40 - 50</td></tr><tr><td>Spaces between mechanical and equipment spaces and occupied spaces</td><td>50 - 60</td></tr></table></td></tr>
<tr><td>Documentary Evidences</td><td>Extracts of the design specification showing the requirement for the occupied space with partitions meeting the required STC ratings as per table below:<table><tr><th>Location</th><th>STC rating of partitions</th></tr><tr><td>Between General Office Space</td><td>40 - 50</td></tr><tr><td>Hotel Rooms, Classrooms, Lecture Theatres, Meeting Rooms, Conference Rooms and spaces where confidential speech is required</td><td>50 - 60</td></tr><tr><td>Between Mechanical / Equipment spaces and occupied spaces</td><td>50 - 60</td></tr></table>
Architectural & structural plan layout, elevation and sectional plans showing types of wall system used, dimensions and size of all building and structural elements with STC ratings.
OR
A report of detail analysis and recommendations from acoustic consultant (if applicable).</td></tr>
<tr><td>References</td><td>-</td></tr>
</table>

INT 4-6 HEALTHIER OFFICE AND WELL BEING

Objectives	To improve the nutritional value of food made available to employees on day-to-day basis.
Applicability	Generally applicable to cafeteria, canteens, food stalls, catering engage with the office development.
Baseline Standard	Malaysian Dietary Guidelines, 2010. Panduan Penyediaan Hidangan Sihat (Operator Kantin, Katerer dan Penyedia Makanan), 2005.
Requirements	1 point if all 5 criteria are met for at least one event in the last 3 months
Documentary Evidences	• Catering tender documents showing food provided to be healthy and high nutritional value. • List of menus and its nutrient index.
References	-

INT 4-7 UNIVERSALLY ACCESSIBLE OFFICE DESIGN

Objectives	To cater to the needs of general users as well as special user groups who could visit or work there (e.g. Expectant Mothers, Mature workers, physically challenged employees)
Applicability	Generally applicable to office building developments
Baseline Standard	MS 1184:2014
Requirements	Incorporating universal design concepts within office space such as: • At least one automated door at accessible entrance for ease of access to office space • Stable, firm and slip-resistant walking surfaces at areas with high usage (e.g. walkways, toilets, pantries, staircases) • Main circulation routes and corridors with minimum width of 1800mm to allow one wheelchair and one person to pass each other comfortably • Provision of wheelchair-friendly toilets equipped with grab bars and emergency call bells • Provision of Nursing Rooms equipped with seating, power socket, countertop with wash basin and refrigerator • Access to assistive technology (mobility, visual, hearing)
Documentary Evidences	• Detail drawing of universal design features • Material selection and its benefits • Technical product details of all the universal design concept incorporated.
References	-

INT 5-1 GREEN FEATURES & INNOVATIONS

<table>
<tr><td>Objectives</td><td>Encourage the use of green features which are innovative and have positive environmental impact on water efficiency, environmental protection and indoor environmental quality of the buildings.</td></tr>
<tr><td>Applicability</td><td>Generally applicable to interior office developments.</td></tr>
<tr><td>Baseline Standard</td><td>-</td></tr>
<tr><td>Requirements</td><td>Up to 8 credits are awarded for the use of the following green features depending on their potential environmental benefits or reduced environmental impacts.

Table 5-1.1: Weightage for credits allocation
<table><tr><th>Extent of use</th><th>Credits Allocation</th></tr><tr><td>Low impact</td><td>0.5</td></tr><tr><td>Medium Impact</td><td>1.0</td></tr><tr><td>High Impact</td><td>2.0</td></tr></table>
Examples:
• Use of printing access through swipe access card to help minimize unnecessary printing.
• Provision of internal staircase to discourage usage of lifts.
• Use of non-disposable cups for meetings and staff.
• Provision of green walls.
• Use of tele-conferencing to reduce travelling needs etc
• Follow-me printing or secure printing, with printing options set to default greyscale and duplex printing
• Digitalising internal processes e.g. HR/ administrative processes, approval, claims, payments to suppliers, etc.
• Dissemination of information and circulars through emails, intranet, share point, staff notice board, etc.
• Encouraging staff to bring their own electronic devices to meetings instead of printing</td></tr>
<tr><td>Documentary Evidences</td><td>• Extracts of the tender specification showing the provision of the specific green features used and the extent of implementation where applicable.
• Technical product information (including drawings and supporting documents) of the green features.
• Quantified evidences on the potential environmental benefits that are features can bring to the development.</td></tr>
<tr><td>References</td><td>-</td></tr>
</table>

Part 6 – Carbon Emission of Development

INT 6-1 CARBON EMISSION OF DEVELOPMENT

Objectives	To calculate the carbon emission resulted from the associated energy used during renovation works and operational phase of a development.
Applicability	Generally applicable to all interior building development.
Baseline Standard	-
Requirements	6-1 (a) 1 credit can be scored for the calculation of the carbon footprint report of the building comprising of energy and water consumption savings with comparison of the baseline parameters. 6-1 (b) 0.25 credits for every material declared up to 2 credits (Finishes, raw renovation material)
Documentary Evidences	For 6-1 (a) • Detail calculation for the estimated energy load for each component in the building e.g.: lighting, air-conditioning system, pump, receptacle load. • Details calculation for estimated water consumption of the building e.g.: water fittings, landscape, water features. • Technical product information on the energy efficient features and water efficient features used. • Summary tabulation of estimated total energy savings and total water savings of the development for the year. • Carbon emission calculation. For 6-1 (b) • Embodied carbon footprint calculation
References	-

Worked Example 6-1

Energy Consumption:

Type of usage	Design (kWh/yr)	Baseline (kWh/yr)
Lighting	819,498	1,151,575
Air-Conditioning	860,589	1,406,899
M/V System	25,550	25,550
Total Energy Usage	1,705,637	2,584,024

Water Consumption:
(Please refer GreenRE Water Calculator)

Type of fixtures	Design (m^3/yr)	Baseline (m^3/yr)
Flow Fixtures	2,402	6,899
Flush Fixtures	5,366	5,161
Total Water Usage	7,768	12,060

Carbon Footprint:

Type of usage	Design $kgCO_2e/yr$	Baseline $kgCO_2e/yr$
Energy	1,226,619	1,860,497
Water	3,254.79	5,053.14
Total Annual Carbon Footprint	1,229,874	1,865,550

Energy CO2 Emission Reduction (ktCO2e/annum, based on electricity energy reduction only @ 1kWh =

- 0.694 kg CO2- Peninsular
- 0.699 kg CO2- Sarawak
- 0.536 kg CO2- Sabah)

Water CO2 Emission Reduction / m^3 = 0.419 kg CO^2

Credits scored for 6-1 (a) = 1 credit

<u>Embodied carbon calculation</u>

No	Material	Description	tCO2e		Quantity	Total tCO2e
			Value	Unit		
1	Concrete (G30)	Slab	0.309	m^3	9876.19	3051.74
2	Glass	10mm of Glass (Single Glass excluding Frame)	0.035	m^2	4500.00	157.50
3	Steel	Rebar	1.2	kg	5000.00	6000.00
	Total					**9209.24**

Credits scored for 6-1 (b) = 0.75 credit

The project entitled = 1.75 credits