



建築環保評估協會

# BEAM Society Limited

BEAM Plus New Buildings (NBv2.0)  
Training and Examination  
Materials and Waste (MW)  
for New Buildings



# BEAM Plus Assessment Tool



4 Sep 2019



# BEAM Plus Assessment Tool

NB v1.2	Weighting	NB v2.0	Weighting
		Integrated Design and Construction Management (IDCM) <i>New</i>	18%
Site Aspects (SA)	25%	Sustainable Sites (SS)	15%
<b>Materials Aspects (MA)</b>	<b>8%</b>	<b>Materials and Waste (MW)</b>	<b>9%</b>
Energy Use (EU)	35%	Energy Use (EU)	29%
Water Use (WU)	12%	Water Use (WU)	7%
Indoor Environmental Quality (IEQ)	20%	Health and Wellbeing (HWB)	22%
	100%		100%

# BEAM Plus NB v2.0

Overall score

75%

65%

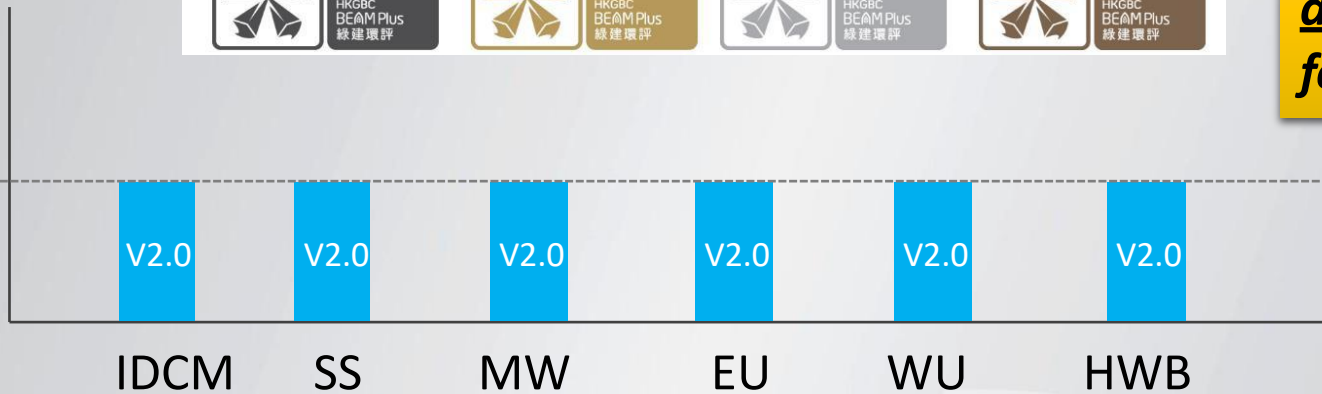
55%

40%



***Min. 20% at  
all categories  
for all ratings***

20%



v2.0 now allows flexibility amongst categories achievements.

After achieving the 20% threshold, project would have a greater freedom to put their commitment for the overall scoring.

# BEAM Plus NB v2.0








## Materials and Waste

- MW P1 Minimum Waste Handling Facilities
- MW 1 Building Re-use
- MW 2 Modular and Standardised Design
- MW 3 Prefabrication
- MW 4 Design for Durability and Resilience**
- MW 5 Sustainable Forest Products
- MW 6 Recycled Materials
- MW 7 Ozone Depleting Substances
- MW 8 Regional Materials**
- MW 9 Use of Certified Green Products**
- MW 10 Life Cycle Assessment
- MW 11 Adaptability and Deconstruction
- MW 12 Enhanced Waste Handling Facilities**

3 NEW  
Credits

# BEAM Plus NB v2.0 Categories

Bonus Credits NOW account into each respective Category, with multiplier 1.2

	<b>Integrated Design &amp; Construction Management (IDCM)</b>	3P	25C	14B
	<b>Sustainable Site (SS)</b>	1P	20C	19B
	<b>Materials and Waste (MW)</b>	1P	14C	21B
	<b>Energy Use (EU)</b>	1P	31C	13B
	<b>Water Use (WU)</b>	1P	12C	3B
	<b>Health and Wellbeing (HWB)</b>	1P	19C	10B
	<b>Innovations and Additions (IA)</b>	/		10B

Guidance Table for Submission can be found in Manual for both PA and FA

Supporting Documents		PA	FA
<i>Please provide below softcopies with filename prefix as indicated on leftmost column.</i>			
MW_09_00	Submission template for MW 9	✓	✓
MW_09a_01	Summary table, with product type, manufacturer, certification body, quantities The summary table shall be prepared and declared by the main contractor, and reviewed and endorsed by the project quantity surveyor.	-	✓
MW_09a_02	<b>Specifications</b> specifying the use of green products	✓	-
MW_09a_03	Calculations showing the percentage of certified green products purchased	✓	✓
MW_09a_04	Drawings showing the provision	-	✓
MW_09a_05	Certificate(s) of the green products	-	✓

- Specific Submittal
- **No** more DN/PO
- **No** more Dated Photo Record
- **Random** Site Audit

### Site Audit

BSL shall, in due course after consultation with stakeholders, institute a random site audit mechanism as part of the verification processes. Details will be given in an Audit Manual yet to be issued. Audit will be conducted only after the official publication of the Audit Manual and formal implementation of the audit mechanism.

# Principal Aims :

## 1. Promote Sustainable Use of Natural Resources

To use natural, sustainable, rapidly renewable material; to save natural resources including using recycled content material and reused material to achieve low environmental impacts, protect ozone layer & minimize greenhouse gas.

## 2. Efficiency Use of Materials

To re-use of building elements, flexibility in design, off-site fabrication of major building components, allows for deconstruction, and improves durability and longevity of buildings.

## 3. Waste

- Minimize waste generation.
- Encourage waste recycling.
- Conserve land filling space.



## Deforestation



## Rapid Urbanization

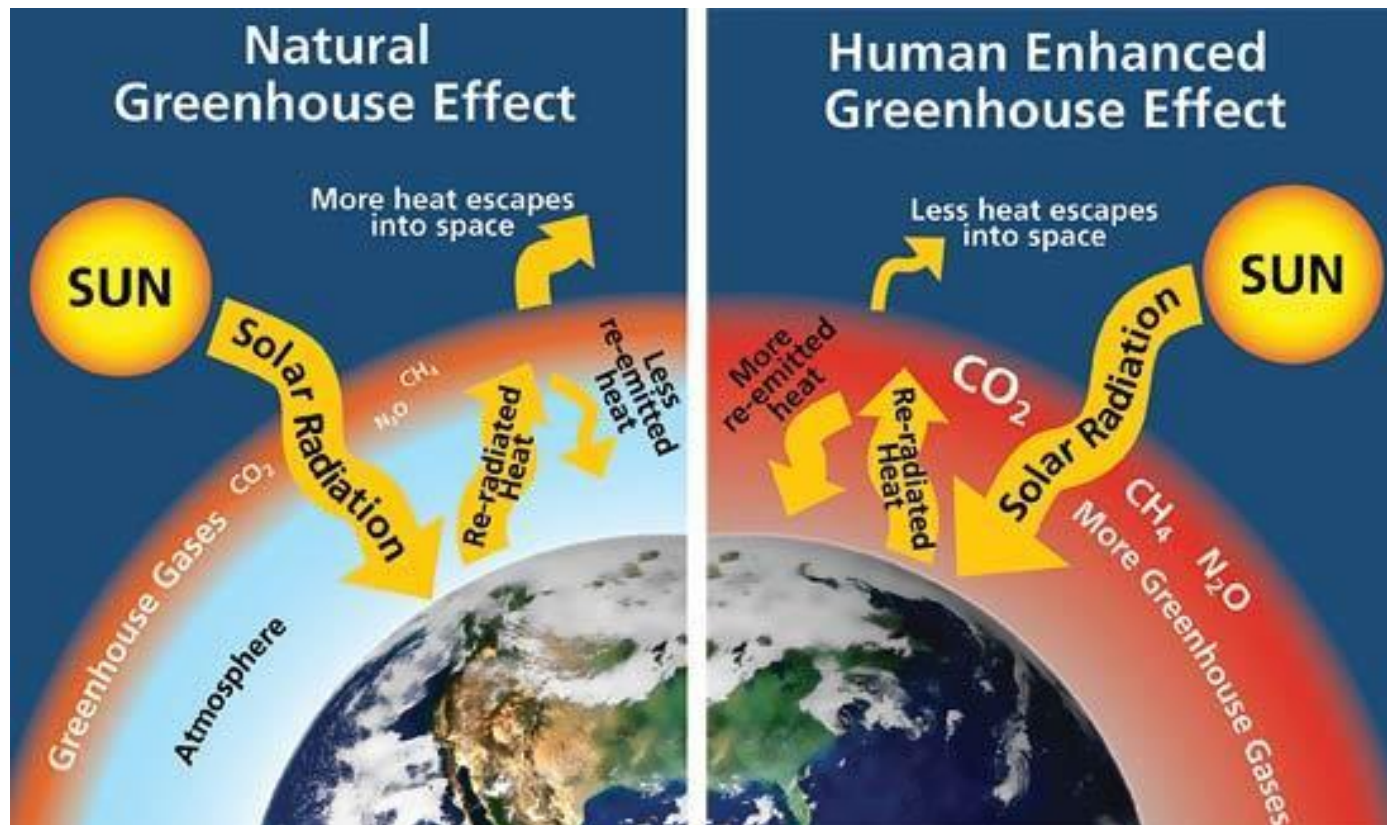


## Use of Fossil Oil



Source: <http://climate.nasa.gov/solutions/adaptation-mitigation/>  
<http://m.phys.org/news/2013-09-poland-anchors-energy-strategy-coal.html>

# Global Warming



# BEAM Plus NB v2.0

## MW P1 – Minimum Waste Handling Facilities

*NB v 1.2 MA P4* Credit: **NA**

### **Extent of Application:**

All buildings except one-single family domestic building with not more than 3 floors, or domestic part of a composite building for one single family with not more than 3 floors, or a building not normally occupied or for transient stay (e.g. pump house, sewage treatment plant, carpark building).

### **Objective:**

Reduce waste generation at source, reduce pressure on landfill sites and help to preserve non-renewable resources by promoting recycling of waste materials

### **Credits Attainable:**

Prerequisite

### **Credit Requirement:**

Prerequisite achieved for meeting the minimum provisions of waste recycle facilities for the collection, sorting, storage, recycling (recovered material) and disposal (waste).

# BEAM Plus NB v2.0

## MW P1 – Minimum Waste Handling Facilities

NB v 1.2 MA P4 Credit: NA

### Space Requirements :

	Overall floor space of RS&MRC <sup>#</sup>
Residential/ Domestic	For UFS $\geq 1,320\text{m}^2$ , $1\text{m}^2$ per $347\text{m}^2$ UFS  For UFS $< 1,320\text{m}^2$ , please refer to point 3 below.
Hotel	$1\text{m}^2$ per $347\text{m}^2$ UFS
Retail/ Commercial/ Clubhouse	For UFS $< 39,600\text{m}^2$ , $2\text{m}^2$ per $925\text{m}^2$ UFS  For UFS $\geq 39,600\text{m}^2$ , $1\text{m}^2$ per $925\text{m}^2$ UFS + $43\text{m}^2$
Non-residential/ Non-domestic buildings other than Retail/ Commercial/ Clubhouse	$1\text{m}^2$ per $925\text{m}^2$ UFS

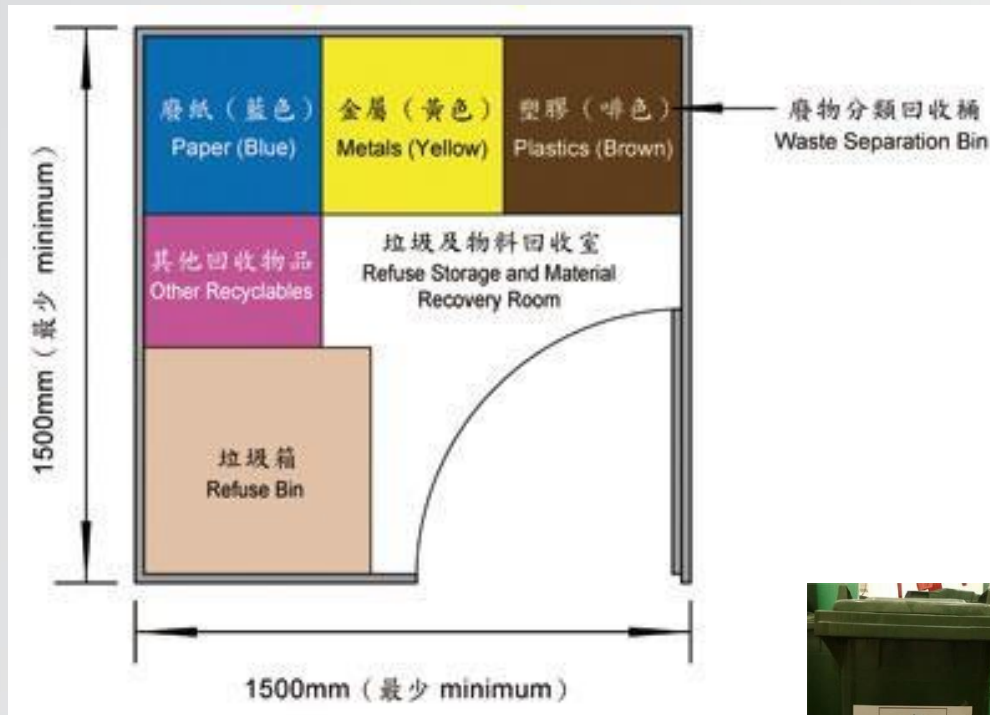
#### Remarks:

- UFS = Usable Floor Area
- The provision of Refuse Storage & Material Recovery Chamber (RS&MRC) is required under “Schedule” in B(RS&MRC&RC)R.
- RS&MRR shall not be included in the RS&MRC space requirement calculation. Additional areas of waste and recycling facilities provided in addition to the statutorily required RS&MRR can be counted.
- # Point 3 under Part (b) applies

# BEAM Plus NB v2.0

## MW P1 – Minimum Waste Handling Facilities

NB v 1.2 MA P4 Credit: NA



RS&MRC

Source:

<http://www.epd.gov.hk/epd/SSDW/2008/eng/ch05.html>

[http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob\\_solutions/guidebook2006/ENG-Ch03-1.htm](http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/guidebook2006/ENG-Ch03-1.htm)

[http://www.susdev.org.hk/susdevorg/archive2009/en/irdoc/irdoc\\_4.html](http://www.susdev.org.hk/susdevorg/archive2009/en/irdoc/irdoc_4.html)

**Requirements/Provision for achieving the prerequisite:**

- (a) Operational waste management plan
- (b) Waste recycling facilities
- (c) Minimum types of recyclables to be collected



Source:

<https://www.epd.gov.hk/epd/SSDW/2008/eng/ch05.html>

<https://www.indiamart.com/proddetail/four-wheeled-waste-bin-10863388830.html>

# MW 12 ENHANCED WASTE HANDLING FACILITIES

Credit: 2+ 2B

NEW

## EXTENT OF APPLICATION

Same as MW P1

## OBJECTIVE

- Encourage integrated waste management for operational reduction at source, effective sorting and collection within the site & recycling/ reusing of waste.

## REQUIREMENT

### (a) Additional Recyclables Collection

1 credit for the provision of facilities for collection, sorting, storage and disposal of 2 other recyclable streams in addition to those described in MW P1.

### (b) Additional Facility Provisions to Enable enhanced Municipal Solid Waste (MSW) Charing Scheme

1 credit for additional facilities for collection, sorting, storage and disposal of recyclables in addition to those described in MW P1 and MW12 part (a).

### (c) Waste Treatment Equipment

1 BONUS for providing at least one set of waste treatment equipment.

### (d) Alternatives to Recycling Facilities

1 BONUS for provide alternative means of waste collection systems.

## HIGHLIGHTS

AREA



Metal

Plastic

Paper/Card

Glass



(a) Food Waste

Organic  
Landscape  
waste

etc



(b) Provision



(c) Treatment  
Equipment

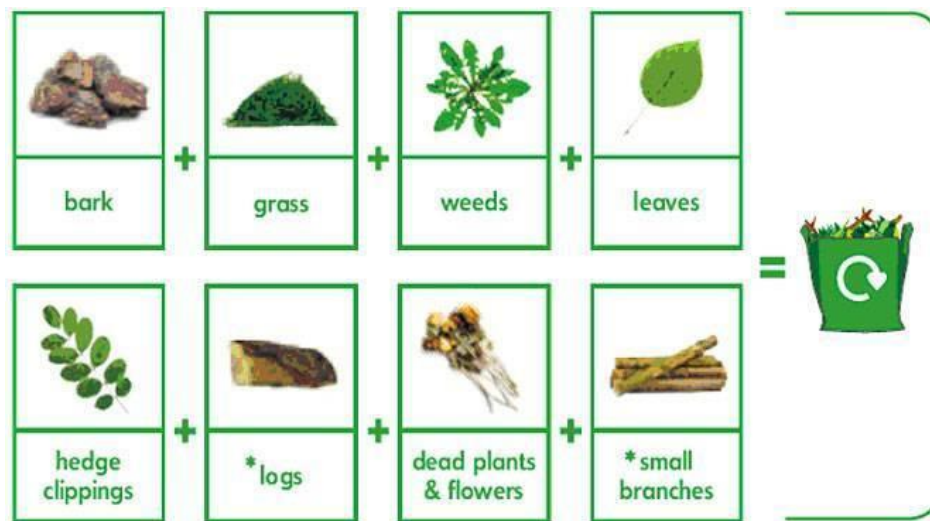


(d) Automate

## Food Waste



## Landscape Waste



\* up to 50cm in diameter



# Waste Treatment Equipment

## Concrete and Rock

Only broken concrete and rock pieces are suitable for recycling with in Hong Kong.

Concrete and rock pieces can be broken into **Recycled Aggregates and Granular Materials** to form recycle concrete for construction works.



## Steel

Overbelt magnet

The over-belt electro magnetic separator allows for efficient separation and recovery of ferrous metal material.



## Glass

Glass Breaker Screen

The screen is a multi-deck that utilises cast chromium elliptical to break and separate glass at highly efficient rates.



# Centralized waste management



### **Extent of Application:**

All buildings

### **Objective:**

Encourage the reuse of major elements of existing building structures, to reduce demolition waste, conserve resources and reduce environmental impacts during construction.

### **Credits Attainable:**

2 BONUS + 1 additional BONUS

### **Credit Requirement:**

#### Compliance Method 1

**1BONUS credit** for the reuse of 20% or more (by mass or volume) of existing structures (sub-structure and superstructure).

**2BONUS credits** for the reuse of 40% or more (by mass or volume) of existing structures (sub-structure and superstructure).

**For exemplary performance, 1 additional BONUS credit** for the reuse of 90% or more (by mass or volume) of existing structures (sub-structure and superstructure).

**Credit Requirement:**Compliance Method 2

**1BONUS credit** for the reuse of 25% or more (by surface area) of superstructure elements (including at least floor, roof decking) & enclosure materials (including at least skin, framing).

**2BONUS credits** for the reuse of 50% or more (by surface area) of superstructure elements (including at least floor, roof decking) & enclosure materials (including at least skin, framing).

**For exemplary performance, 1 additional BONUS credit** for the reuse of 90% or more (by surface area) of superstructure elements (including at least floor, roof decking) & enclosure materials (including at least skin, framing).

**Requirements/Provision for achieving the credit(s):**

Reuse of certain percentage of major elements of existing building, substantiated by

(a) Calculation

(b) Pre and post construction information, e.g. structural drawings

# BEAM Plus NB v2.0

## MW 1 – Building Re-use

NB v1.2 MA 1

Credit: 2B+1B add



The Legislative Council  
building, Central, Hong Kong  
2015

Wai Yip Street, Kung Tong 2016  
From Industrial to office

Source:

[https://en.wikipedia.org/wiki/Court\\_of\\_Final\\_Appeal\\_Building](https://en.wikipedia.org/wiki/Court_of_Final_Appeal_Building)

<http://www.archdaily.com/788814/133-wai-yip-street-mrvd>

Last view: 28/6/2016

**Extent of Application:**

All buildings except for single one-storey buildings with total floor areas not exceeding 230m<sup>2</sup>.

**Objective:**

Encourage the increased use of modular and standardised components in building design in order to enhance buildability and to reduce waste

**Credits Attainable:**

1 + 1 additional BONUS

**Credit Requirement:**

1 credit for designing modular elements which contributed at least 50% (by mass, volume, dollar value or surface area) of the major elements and modules in the project.

**For exemplary performance, 1 additional BONUS credit** for designing modular elements which contributed 90% or more (by mass, volume, dollar value or surface area) of the major elements and modules in the project

**Requirements/Provision for achieving the credit(s):**

Modular design for elements which contributed at least 50% (by mass, volume, dollar value or surface area), substantiated by

- (a) Calculation
- (b) Design information, e.g. structural drawings

**Extent of modular and standardised design checklist**

<b>Structural elements</b>	Structural beam system Concrete slab Concrete flooring
<b>Facade elements</b>	External wall Cladding unit Bay window (for residential buildings) Utility platform/ balcony (for residential buildings)
<b>Architectural/ internal building elements</b>	Internal partition/ wall panels Door sets Staircases





## Façade Units



## External Wall

Source:

<http://decor.966v.com/pic/29284-41960.html>

<http://www.gammonconstruction.com/tc/html/projects/projects-31ba7a9d6e6047a78e070cce1a240431.html>



# BEAM Plus NB v2.0

## MW 3 – Prefabrication

NB v1.2 MA 3

Credit: 1+3B add

### Extent of Application:

All buildings

### Objective:

Encourage prefabrication of building elements in order to reduce wastage of materials and quantities of on-site waste

### Credits Attainable:

1 + 3 additional BONUS



In Hong Kong, Prefab construction is **commonly used for Public Housing**

## Prefabrication

# Listed building elements (pre-cast concrete)

- Facades
- Staircases
- Slabs
- Balcony/utility platform
- Parapet
- Partition walls
- Bridge-decks
- Footbridges

### Elements shall be **excluded**:

Curtain wall/windows

### Restriction:

The manufacturing factory shall be located within **800 km** of the site.

\* Additional or alternative elements may be included

# BEAM Plus NB v2.0

## MW 3 – Prefabrication

### Credit Requirement:

#### (a) Structural Elements

**1 credit** when 10% of the prefabricated structural elements has been manufactured off-site.

**1 additional BONUS credit** when 20% of the prefabricated structural elements has been manufactured off-site.

*Alternatively,*

#### (b) Façade Elements

**1 credit** when 10% of prefabricated facade elements has been manufactured off-site.

**1 additional BONUS credit** when 20% of prefabricated facade elements has been manufactured off-site.

*Alternatively,*

#### (c) Architectural/ Internal Building Elements

**1 credit** when 10% of prefabricated architectural/ internal building elements has been manufactured off-site.

**1 additional BONUS credit** when 20% of prefabricated architectural/ internal building elements has been manufactured off-site..

**1 additional BONUS credit** for compliance with the requirements listed in above sub-item (a), (b) and (c).

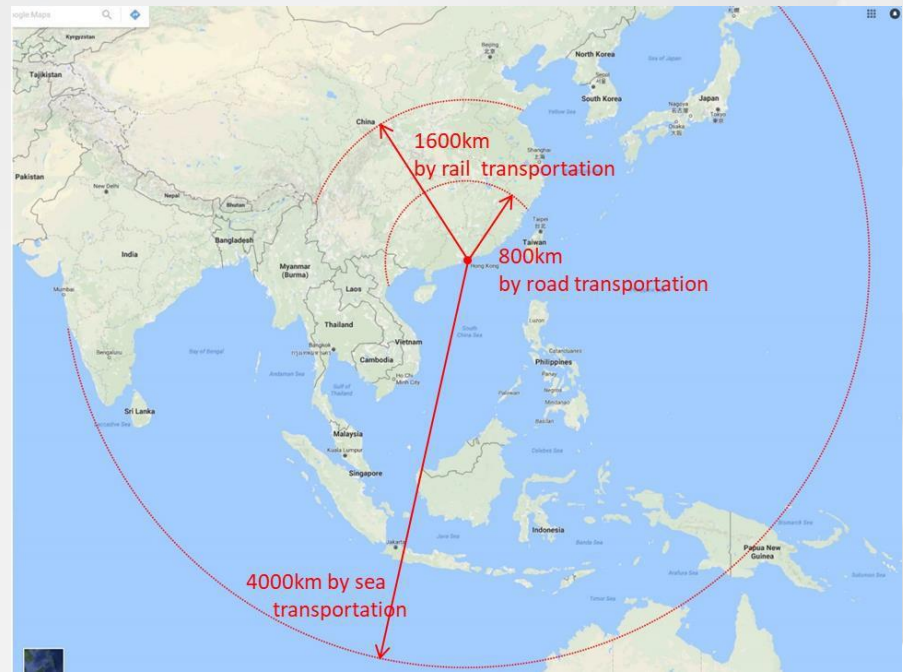
**For exemplary performance, 1 additional BONUS credit** when 50% or more of the prefabricated elements in sub-item (a) or (b) or (c) has been manufactured off-site.

### Requirements/Provision for achieving the credit(s):

Adoption of certain percentage of prefabricated building elements, substantiated by

- (a) Calculation/Summary table for prefabricated building elements
- (b) Design information, e.g. structural drawings
- (c) Map showing the distance between the manufacturing factory and the site

To avoid long-distance transportation, the manufacturing factory shall be located within an 800km radius of the HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation. Travel distances within the HKSAR are ignored in calculation for simplification.



# BEAM Plus NB v2.0

## MW 3 – Prefabrication

### Precast Facade



### Semi-precast slab



### Precast Staircases



### Precast Bathroom



### Precast Kitchen



### Precast Structural Unit



Image source: (Top left ) <https://www.housingauthority.gov.hk/en/business-partnerships/resources/prefabrication-in-housing-blocks/precast-facades/index.html>  
(Top middle) <https://www.housingauthority.gov.hk/en/business-partnerships/resources/prefabrication-in-housing-blocks/semi-precast-slabs-optional/index.html>  
(Top right) <https://www.housingauthority.gov.hk/en/business-partnerships/resources/prefabrication-in-housing-blocks/precast-staircases/index.html>  
(Bottom left ) [http://www.hkengineer.org.hk/program/articlephoto/cs\\_aug05\\_3.jpg](http://www.hkengineer.org.hk/program/articlephoto/cs_aug05_3.jpg)  
(Bottom middle) [http://www.zn903.com/cecspoon/lwbt/Case\\_Studies/Tseung\\_Kwan\\_O\\_73A/Tseung\\_Kwan\\_O\\_73A.htm](http://www.zn903.com/cecspoon/lwbt/Case_Studies/Tseung_Kwan_O_73A/Tseung_Kwan_O_73A.htm)  
(Bottom right) <http://c1038.r38.cf3.rackcdn.com/group1/building3981/media/190.jpg>

# MW 4 DESIGN FOR DURABILITY AND RESILIENCE

## EXTENT OF APPLICATION

All buildings.

## OBJECTIVE

- Encourage material selection and adequate protection of exposed building elements to minimise the frequency of replacement and maximise materials optimisation.

## REQUIREMENT

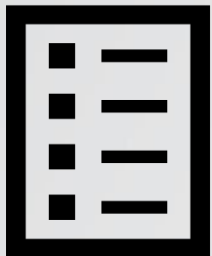
- (a) 1 credit for appraisal report demonstrating a proactive approach to evaluate the durability of the building materials with at least 3 of the relevant listed items.
- (b) 1 BONUS credit for providing suitable protective measures, or designed features or solutions to prevent damage to vulnerable parts.
- (c) 1 BONUS credit for incorporating appropriate design and specification measures to limit material degradation due to environmental factors

## HIGHLIGHTS

- The building material shall be certified to a **specified product certification scheme by a certification body with accreditation** of Hong Kong Accreditation Service (HKAS) and issued with an accredited certificate bearing a Hong Kong Certification Body Accreditation Scheme (HKCAS) accreditation symbol or a statement on the certificate.
- Local product certification schemes for quality assurance, which refer to **Product Certification for Construction Materials by Hong Kong Council for Testing and Certification**.
- Service life
- Suitable protection measures, or designed features or solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements.
- A proactive approach to explain the design measures to protect exposed parts of the building from **material degradation due to environmental factors**.

# MW 4 DESIGN FOR DURABILITY AND RESILIENCE

## (a) Building Material Selection Appraisal



Appraisal Report



The report should cover at least 3 items of the following:

- 2.1 Timber doorsets (fire rated doors)
- 2.2 Panel wall for partitions
- 2.3 Cement products (for architectural uses)
- 2.4 Tile adhesives
- 2.5 Ceramic tiles (floor tiles and wall tiles)
- 2.6 Aluminium windows
- 2.7 Heat soaked tempered glass
- 2.8 Drainage uPVC pipe and fittings
- 2.9 Other items may be proposed at discretion of the applicant



Certificate

# MW 4 DESIGN FOR DURABILITY AND RESILIENCE

## (b) Protecting Vulnerable Parts of the Building from Damage



Protection from the impacts of high pedestrian traffic in Main entrances, public areas and thoroughfares (stairs)



Protection against any internal vehicular or trolley movement.



# MW 4 DESIGN FOR DURABILITY AND RESILIENCE

## (c) Protecting Exposed Parts of the Building from Material Degradation



Protection against water or moisture

# MW 5 SUSTAINABLE FOREST PRODUCTS

Credit: **1+1B add**

## EXTENT OF APPLICATION

All buildings, except buildings with an insignificant amount of timber products being adopted (e.g. all timber products used in the building consists of five sets of doors only).

## OBJECTIVE

- Encourage the use of timber from well-managed forests.

## REQUIREMENT

- 1 credit for demonstrating at least 30% (for residential development) and 50% (for non-residential development) of all the timber and composite timber products used in the project are from sustainable sources/ recycled timber.
- For exemplary performance, 1 additional BONUS for demonstrating 90% or more of all the timber and composite timber products used in the project are from sustainable sources/ recycled timber.

## HIGHLIGHTS

- Timber products or accessories of an insignificant amount and **not forming part of timber doors, flooring, skirting, wall panels, ceiling systems and built-in furniture** can be ignored in calculation for simplification.

# MW 5 SUSTAINABLE FOREST PRODUCTS

Credit: 1+1B add



**American  
Forest & Paper  
Association**

Image source:

(Top) <http://www.homefrenzy.com/wp-content/uploads/2013/06/Pedrali-FSC-Logo.jpg>

(bottom) [http://www.gonpta.com/resource/resmgr/images/partner\\_afpa.jpg](http://www.gonpta.com/resource/resmgr/images/partner_afpa.jpg)

(Right) <http://www.forestlinkhk.com/pefc-cert/>



## Timber Formwork

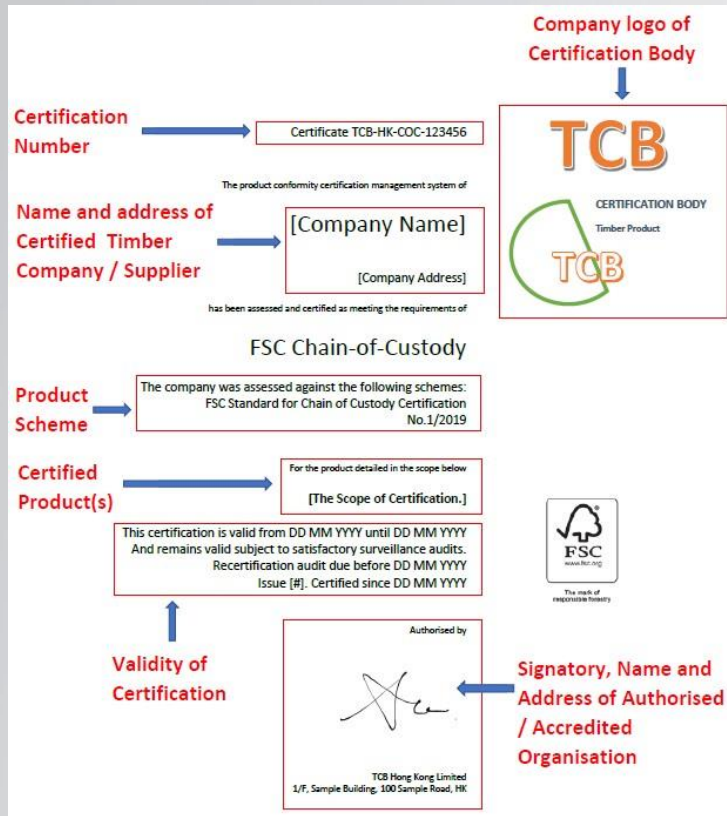
Image source:

<http://www.cityu.edu.hk/CIVCAL/production/traditional/>

(Last Viewed 24<sup>th</sup> April 2014)

## Timber products are issued with the Certificate under the COC (Chain of Custody) system

1. Timber COC Certificate;
2. Invoice with delivery notes;
3. Photographic evidence of the timber products



### DELIVERY NOTE

To :		Your Order Number :	
Address :		Date Sent :	
		Per Invoice Number :	
		Our Contact Person :	
Attention :		Telephone :	

Quantity Delivered	Description



# MW 6 RECYCLED MATERIALS

NB v1.2 MA 7

Credit: 1+2B add

## Credit Requirement:

(a) Outside Surface Works and Structures

**1 credit** where at least 10% of all materials used for site exterior surface works, structures and features with recycled content.

*Alternatively,*

(b) Building Façade and Structural Components

**1 credit** where at least 10% of all materials used for facade and structural components are materials with recycled content; OR

the use of Pulverised Fuel Ash (PFA) as a partial cement replacement in concrete that the PFA content is not less than 25%; OR

the use of Ground Granulated Blast-furnace Slag (GGBS) as a partial cement replacement in concrete that the GGBS content is not less than 40%.

*Alternatively,*

(c) Interior Non-structural Components

**1 credit** where at least 10% of all materials used for interior non-structural components are materials with recycled content.

**1 additional BONUS credit** for compliance with the requirements listed in sub-item (a), (b) and (c).

**For exemplary performance, 1 additional BONUS credit** where 50% or more of all materials used for sub-item (a) or (b) or (c) are materials with recycled content.

# MW 6 RECYCLED MATERIALS

NB v1.2 MA 7

Credit: 1+2B add

## Extent of Application:

All buildings

## Objective:

Promote the use of recycled materials in order to reduce the consumption of virgin resources

## Requirements/Provision for achieving the credit(s):

Adoption of certain percentage of building elements with contents of recycled materials, substantiated by

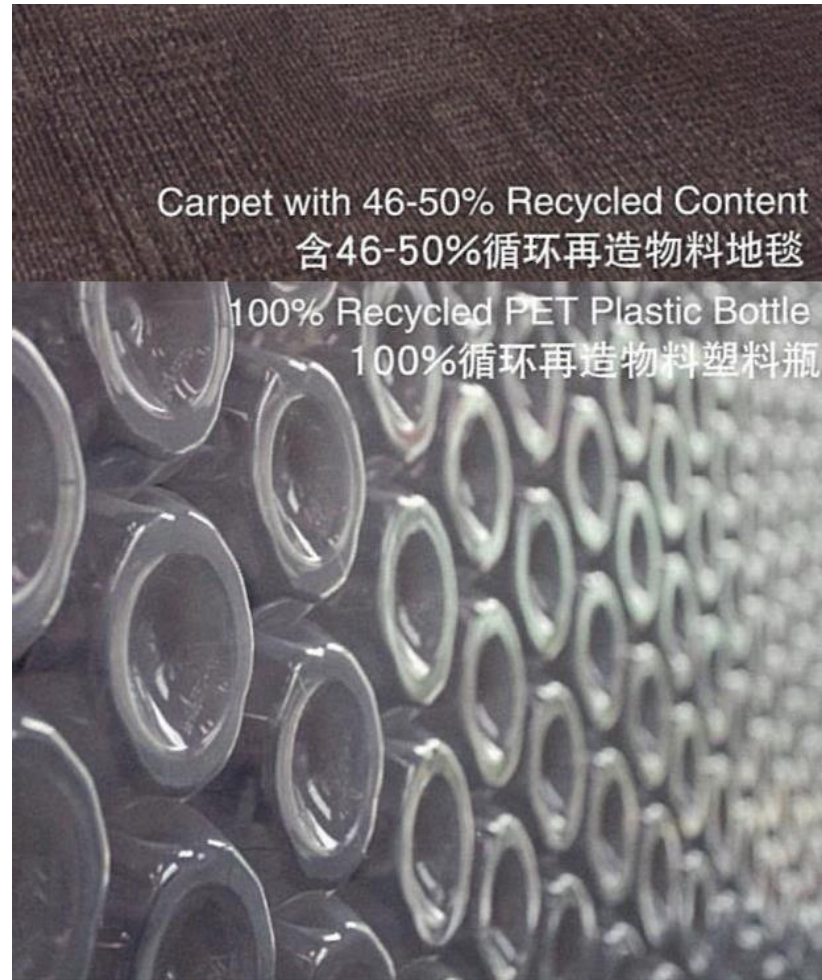
- (a) Calculation/Summary table for building elements
- (b) Drawings showing the location of adopting the selected product
- (c) Information (e.g. catalogues) to demonstrate the outside surface works and structures are made from recycled materials

## Highlights:

- The unit may be mass/ volume/ dollar value but shall be **consistent** throughout the assessment of this credit.
- Steel and glass** which normally consist of recycled content will **not** be considered as materials with recycled content for this credit.

## Recycled Material

# Examples of Recycled Materials



The use of recycled materials can **reduce** the consumption of **virgin resources**.

## Examples of field application of Eco-Blocks





# Recycled Materials

## Recycled PET bottle

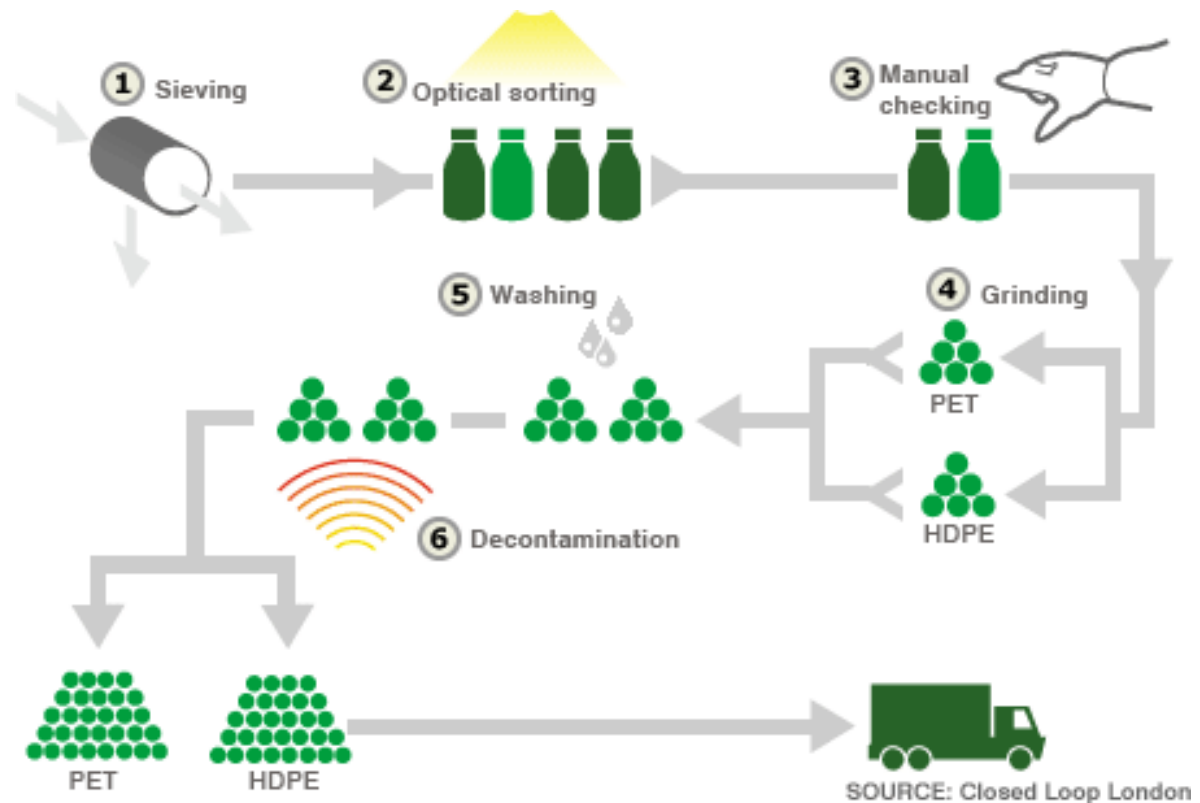


Made from 100% recycled **Polyethylene Terephthalate Polymer**, it is translucent, naturally insulated, and durable

Used in The Hong Kong Green Building Council (HKGBC) Headquarters



### PET Bottles Recycling Process



Source: [http://www.igsdirectory.com/industry/recycling\\_equipment/](http://www.igsdirectory.com/industry/recycling_equipment/) and [www.yial.com.hk](http://www.yial.com.hk) (Last Viewed 24<sup>th</sup> April 2018)

## Recycled Material

# Recycled Carpet

Carpets are made from *natural and synthetic fibres* which *can be broken down and recycled to be yarned into recycled carpet* for a wide range of applications from sports surfaces to insulation.



# MW 7 OZONE DEPLETING SUBSTANCES

NB v1.2 MA 8 Credit: 2

## EXTENT OF APPLICATION

All buildings.

## OBJECTIVE

- Reduce the release of harmful ozone-depleting substances into the atmosphere.

## REQUIREMENT

### (a) Refrigerants

- 1 credit for the use of refrigerants with a value less than or equal to the threshold of the combined contribution to ozone depletion and global warming potentials using the specified equation.

Credit: 1

### (b) Ozone depleting materials

- 1 credit for the use of products in the building fabric and services that avoid using ozone depleting substances in their manufacture, composition or use.

Credit: 1

## HIGHLIGHTS

- Reference shall be made to refrigerant suppliers and/or equipment manufacturer's data, etc. **Guidance provided by recognized authorities such as ASHRAE, CIBE, etc is not requested.**

## Ozone Depleting Substances

# ODP and GWP

The **ozone depletion potential (ODP)** of a chemical compound is the relative amount of degradation to the ozone layer it can cause.

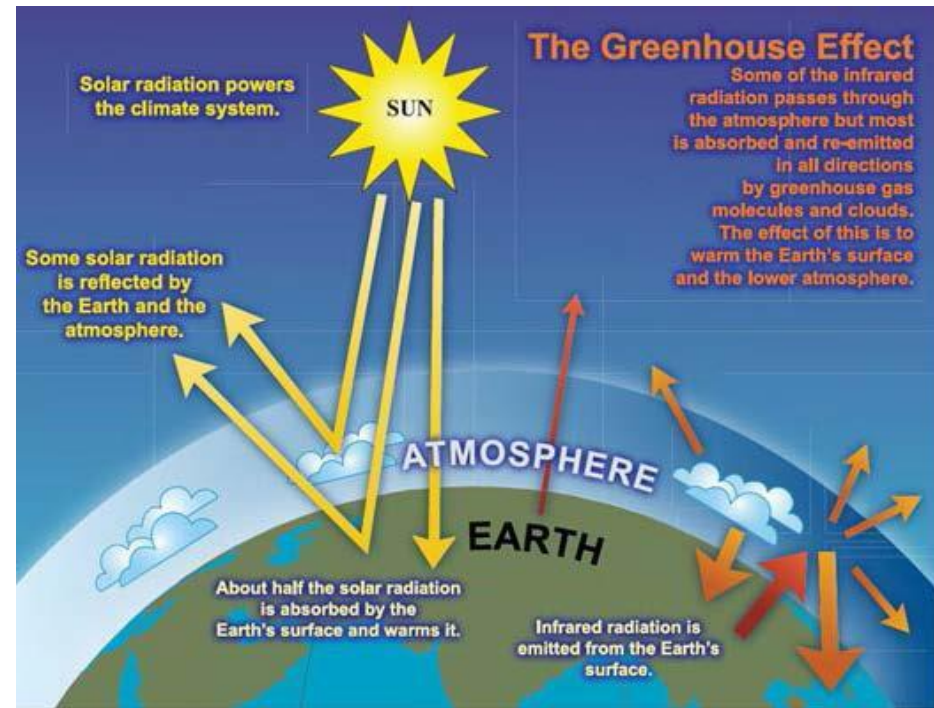
**Global-warming potential (GWP)** is a relative measure of how much heat a greenhouse gases traps in the atmosphere.

### Types of Ozone Gases

Chlorofluorocarbons (Refrigerators)

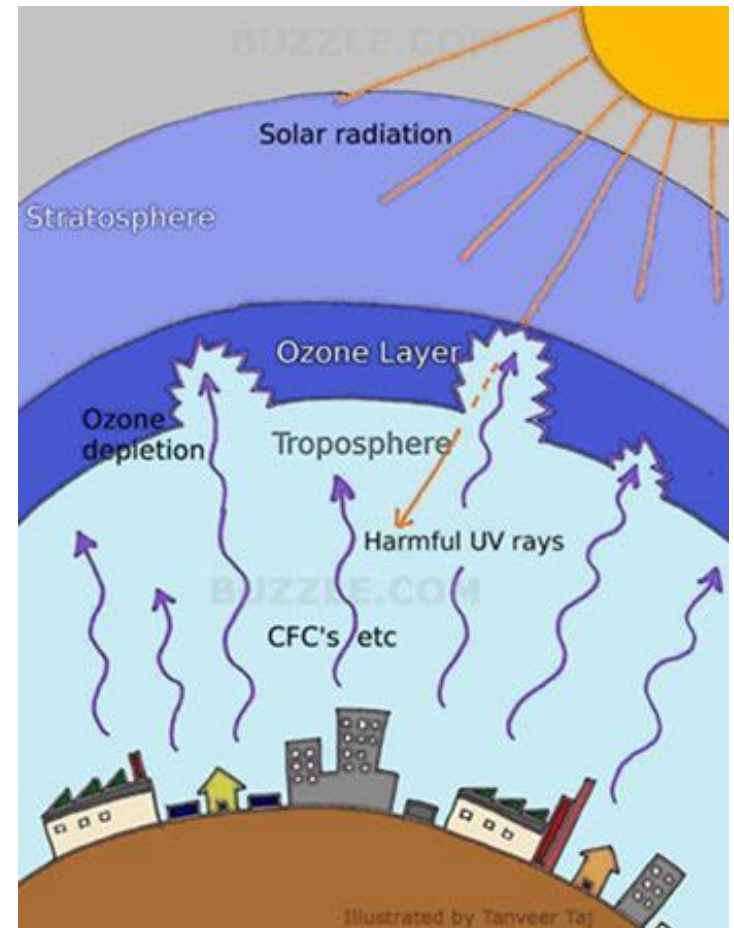
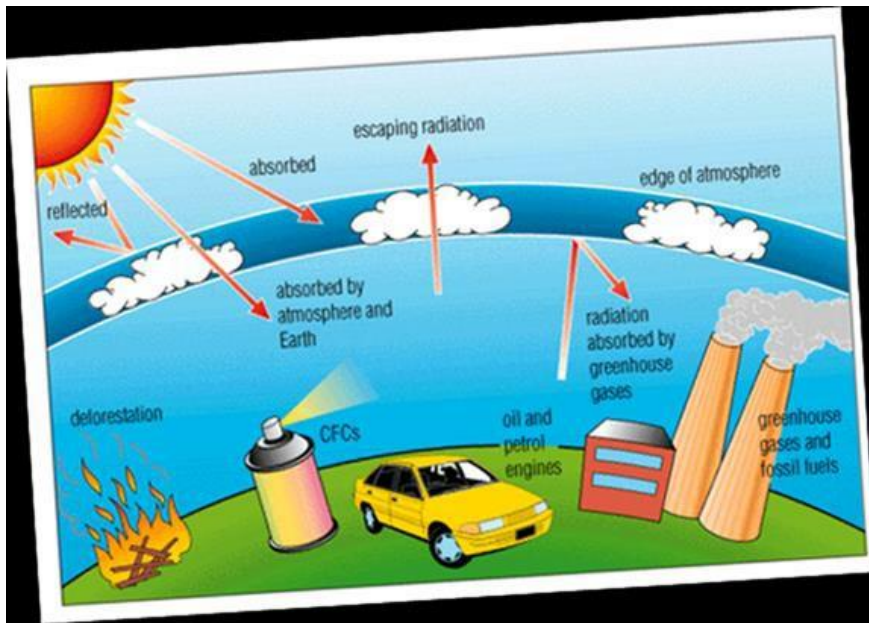
Halons (Fire Suppression)

Hydrochlorofluorocarbons (Air Conditioning)



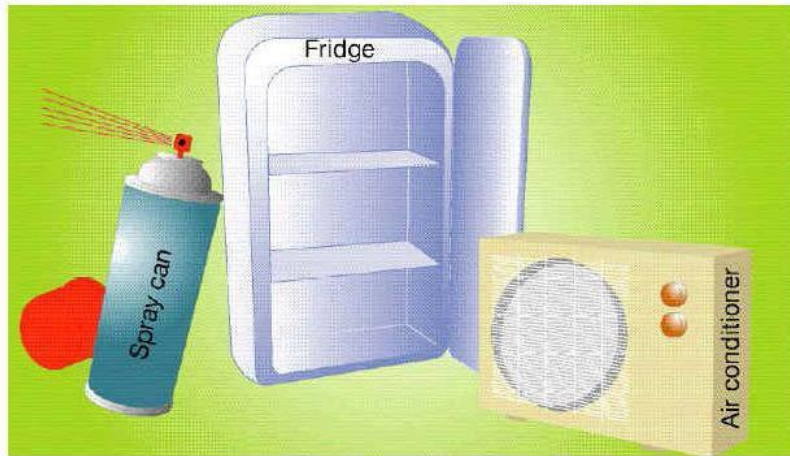
Use of Non-CFC Based Refrigerants

# Common sources leading to Ozone Depletion

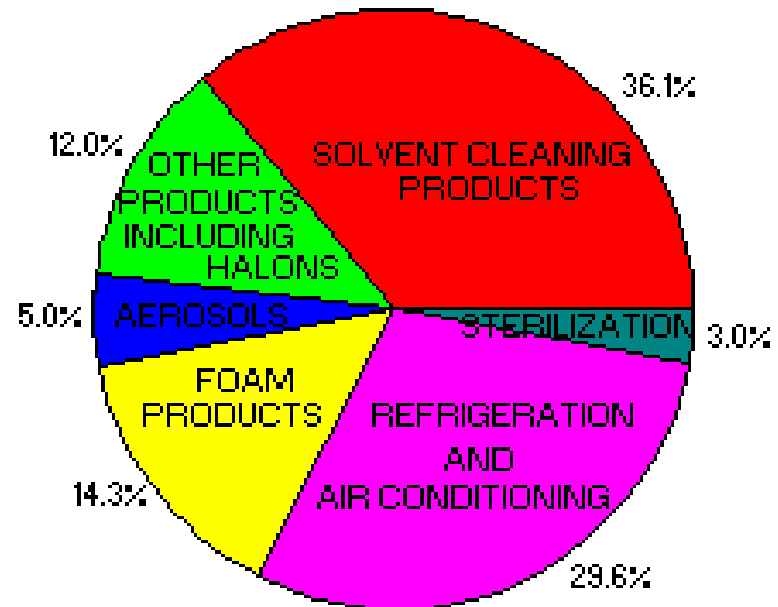


## Use of Non-CFC Based Refrigerants

# Common sources of CFC releasing products



## SOURCES OF OZONE DEPLETING SUBSTANCES



Man-made chemicals such as chlorofluorocarbons (CFC) have **huge effect on Ozone depletion.**

Image source:

<http://www.theozonhole.com/images/ozoned1.jpg> and  
<http://www.policyalmanac.org/environment/archive/ozone.shtml>

(Last Viewed 24<sup>th</sup> April 2018)

# MW 8 REGIONAL MATERIALS

Credit: **1+2B add** NB v1.2 MA 9

## EXTENT OF APPLICATION

All buildings.

## OBJECTIVE

- Encourage the use of materials originated locally so as to reduce the environmental impacts arising from transportation.

## REQUIREMENT

- 1 credit for the use of regional materials meeting prescribed requirement, which contribute at least 10% of all building materials used in the project.
- 1 additional BONUS credits for the use of regional materials meeting prescribed requirement, which contribute at least 20% of all building materials used in the project.
- For exemplary performance, additional BONUS credit for the use of regional materials meeting prescribed requirement, which contribute 50% or above of all building materials used in the project.

## HIGHLIGHTS

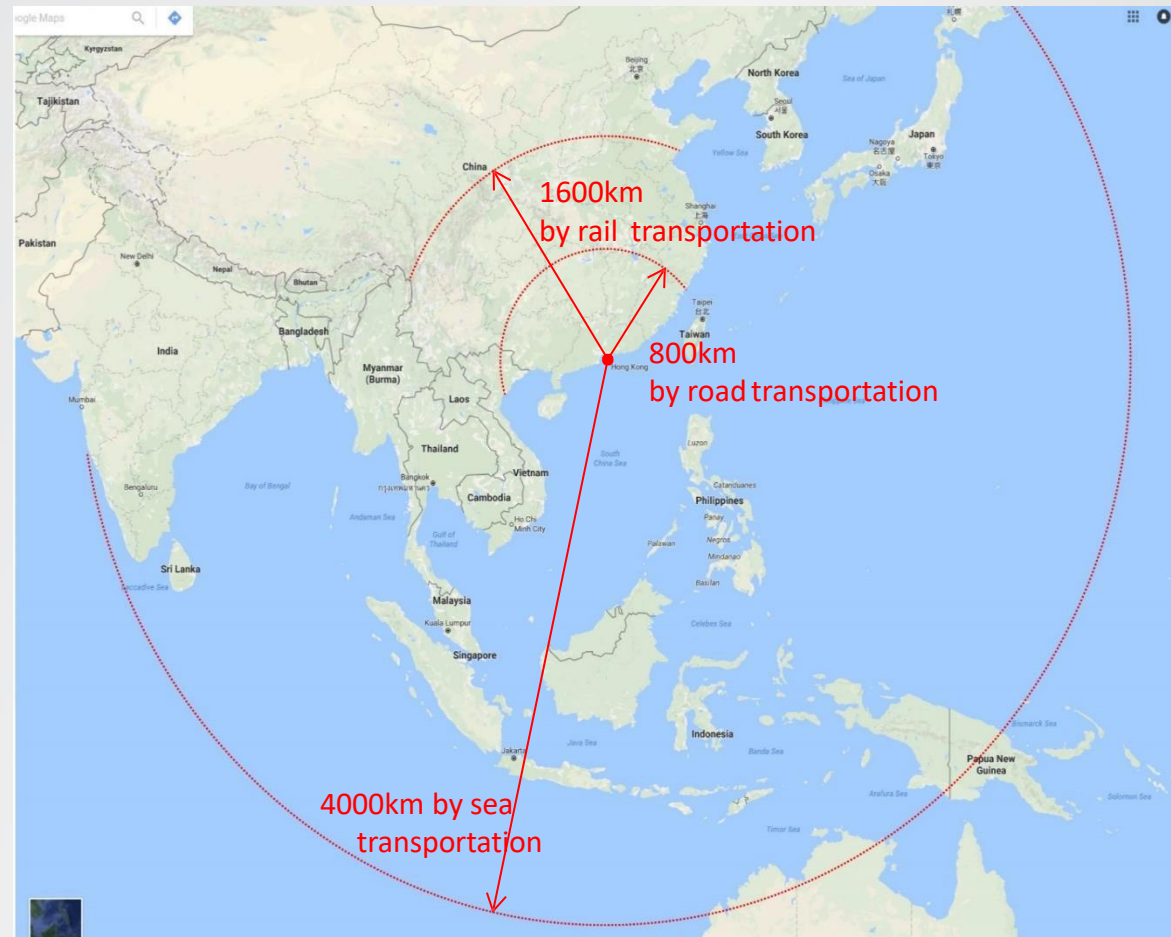
- Raw materials (constituents) used for making the claimed building materials shall fulfill the assessment requirements.
- In-situ concrete, which is unlikely imported outside the region, will not be considered for this credit. The quantity of in-situ concrete shall be excluded from calculation of the total building materials for this credit.
- The point of raw materials and manufacture shall be located within an **800km radius of HKSAR by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation**. A default coordinates  $22^{\circ} 17'07''$  N,  $114^{\circ} 09'27''$  E shall be used to denote HKSAR in calculation. Travel distances within HKSAR are ignored in calculation for simplification.

# MW 8 REGIONAL MATERIALS

Credit: 1+2B add NB v1.2 MA 9

## Requirements/Provision for achieving the credit(s):

- The point of manufacture shall be located within an 800km radius of HKSAR (22°17'07" N, 114°09'27" E) by road transportation; within a 1,600km radius by rail transportation; or within a 4,000km radius by sea transportation.
- 22°17'07" N, 114°09'27" E (<http://dateandtime.info/citycoordinates.php?id=1819729>)





# MW 9 USE OF GREEN PRODUCTS (a)

Credit: **2+3B add**

**NEW**

## EXTENT OF APPLICATION

All buildings.

## OBJECTIVE

- Encourage to use green products that have low environmental impact.

## REQUIREMENT

### (a) Certified green products

- 1 credit for having at least **5%** certified green products in **one** of the listed categories (**outside surface works, building façade & structures, interior non-structural components, and building services components**).
- 2 credit for having at least **5%** certified green products in **two** of the listed categories
- 1 additional BONUS credit for having at least **5%** of certified green products under **CIC Green Product Certification/ Carbon Labelling Scheme/ HKGBC HK G-PASS** in one of the listed categories
- For **exemplary performance**, ADDITIONAL BONUS credit for having at least **25%** of certified green products under CIC Green Product Certification/Carbon Labelling Scheme/HK G-PASS in one (1) of the listed categories.

## HIGHLIGHTS

- For certified green products as specified in **CIC Green Product Certification/ Carbon Labelling Scheme/ HKGBC HK G-PASS** are deemed to be included in the calculation.
- For any green products, which have been certified under other internationally recognised schemes, the applicant shall refer to the of Worldwide Recognised Green Building Product Certifications and Standards under **HKGBC's Eco-Product Directory** (<http://epdir.hkgbc.org.hk/textdisplay.php?serial=32>) or provide the product's technical information with justification for BSL's consideration.

# MW 9 USE OF GREEN PRODUCTS (a)

## Extent of Application:

All buildings

## Objective:

Encourage the use of green products that have low environmental impacts

## Credits Attainable:

2 + 3 additional BONUS + 1 BONUS



Carbon Label	
<b>Carbon Rating:</b> B	
Product Category: Ordinary Portland Cement	
Product: White Portland Cement (CEM I 52.5)	
Assessment Boundary: Cradle to Site	
Country of Origin: Shenzhen, China	
Manufacturer: ABC Cement Co., Ltd.	
CO <sub>2</sub> Equivalent (t CO <sub>2</sub> e / t cement):	0.90
<b>By life cycle stages (t CO<sub>2</sub>e / t)</b>	
Raw Material Acquisition	0.12
Production	0.74
Transportation to HK (by truck)	0.04
<ul style="list-style-type: none"> <li>Bulk Portland cements for civil engineering, building applications, ready-mixed concrete, and concrete products.</li> <li>Complies with BS EN 197-1 CEM I 52.5N.</li> <li>Carbon footprint assessment complies with ISO/TS 14067:2013</li> </ul>	
<small>The data is provided according to the Carbon Labelling Scheme of the Construction Industry Council, Hong Kong. More information of the labelling scheme can be found at <a href="http://cico.hkicc.org/Eng/CarbonLabelling/">http://cico.hkicc.org/Eng/CarbonLabelling/</a>.</small>	

Applicable Green Products / Materials	Qualifying %	Certified green products under CIC_CLS/ HK G-Pass ?	Basic Credit	Additional BONUS Credit	BONUS Credit
<b>(a)</b> - Outside Surface Works - Building façade and structures - Interior non-structural components - Building services components	5% any one	not necessary	1		
	5% any two	not necessary	2		
	5% any one	yes		1	
	25% any one	yes		1*	
<b>(b) Rapidly renewable materials</b>	5%	n/a			1
	25%	n/a		1	

\* For exemplary performance (i.e. at least 25% of certified green product), one more additional BONUS Credit is granted on top of the one already granted for the 5% certified green products

## Requirements/Provision for achieving the credit(s):

Selection/Adoption of certain percentage of certified green products/rapidly renewable materials in the listed categories stipulated in the Manual.

### Outside Surface Works

1.1 Use of certified green products contributing to at least 5% of all materials as listed below.

Outside surface works	<ul style="list-style-type: none"> <li>i. Pavement Block</li> <li>ii. Stone (Natural/ Artificial)</li> <li>iii. Paint &amp; Coating</li> <li>iv. Alternative elements proposed by the applicant.</li> </ul>
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### Building Façade and Structures

2.1 Use of certified green products contributing to at least 5% of all materials as listed below.

Building Façade and Structures	<ul style="list-style-type: none"> <li>i. Cement</li> <li>ii. Concrete</li> <li>iii. Reinforcing bar</li> <li>iv. Structural steel</li> <li>v. Extruded aluminum product</li> <li>vi. Glazing</li> <li>vii. Alternative elements proposed by the applicant.</li> </ul>
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### Interior Non-structural Components

3.1 Use of certified green products contributing to at least 5% of any 5 items as listed below.

Interior Non-structural Components	<ul style="list-style-type: none"> <li>i. Panel board</li> <li>ii. Ceramic tile</li> <li>iii. Plant-based fibre composite</li> <li>iv. Furniture</li> <li>v. Stone (Natural/ Artificial)</li> <li>vi. Wall covering</li> <li>vii. Paint &amp; coating</li> <li>viii. Adhesive &amp; sealant</li> <li>ix. Block for internal partition</li> <li>x. Synthetic carpet</li> <li>xi. Thermal insulation</li> <li>xii. Alternative elements proposed by the applicant.</li> </ul>
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### Building Services Components

4.1 Use of certified green products contributing to at least 5% of all materials under either (a), (b) or (c) categories as listed below.

Building Services Components	(a) Lighting & electrical installation	<ul style="list-style-type: none"> <li>i. LED lighting</li> <li>ii. CFL</li> <li>iii. Electronic ballast</li> <li>iv. Cable &amp; wire</li> <li>v. Alternative elements proposed by the applicant.</li> </ul>
	(b) Air-conditioning systems	<ul style="list-style-type: none"> <li>i. Chiller</li> <li>ii. VRF split type system</li> <li>iii. AHU</li> <li>iv. FCU</li> <li>v. Cooling tower</li> <li>vi. Alternative elements proposed by the applicant.</li> </ul>
	(c) Plumbing & drainage	<ul style="list-style-type: none"> <li>i. Water pump</li> <li>ii. Sanitary wares-ceramic product</li> <li>iii. Alternative elements proposed by the applicant.</li> </ul>

### Rapidly Renewable Materials

5.1 Use of at least 5% of all building materials/ products of interior non-structural components under the following categories are *rapidly renewable materials*, such as bamboo, cork, natural linoleum, soy bean composite, strawboard, sunflower seed and wheatboard.

Interior Non-structural Components	<ul style="list-style-type: none"> <li>i. Flooring</li> <li>ii. Panel/ partitions</li> <li>iii. Cabinetry/ built-in furniture</li> <li>iv. Insulation</li> <li>v. Alternative elements proposed by the applicant.</li> </ul>
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# HKGBC Green Product Accreditation and Standards

## HK G-Pass

The Phase 1 and Phase 2A of HK G-PASS were launched in January 2015 and February 2016 respectively and now covers the following 20 product categories:

- Extruded Aluminium Product
- Panel Board
- Stone (Natural / Artificial)
- Plant-based Fibre Composite
- Wall Covering
- Chiller
- LED Lighting
- Cable & Wire
- Block for Internal Partition
- Synthetic Carpet
- Glazing
- Ceramic Tile
- Furniture
- Paint & Coating
- Adhesive & Sealant
- CFL
- Electronic Ballast
- Pavement Block
- VRF Split Type System
- Thermal Insulation

- See more at:
- <http://hkgpass.hkgbc.org.hk/textdisplay.php?serial=10>



# BEAM Plus NB v2.0

## MW 10 – Life Cycle Assessment

Credit: **1**  
NB v1.2 EU 3

### Extent of Application:

All buildings

### Objective:

Encourage the design of structural elements and choice of materials that results in **lower embodied energy**

### Credits Attainable:

1

### Credit Requirement:

**1 credit** for demonstrating the embodied energy in the major elements of the building structure of the building has been studied and optimised through a Life Cycle Assessment (LCA).

### Requirements/Provision for achieving the credit(s):

LCA Report



**LCA study should be conducted  
before construction works commencement**

## What is Life Cycle Assessment ?

A **Life Cycle Assessment** is an analysis of the environmental aspects and potential impacts associated with a product, process or service.



Image source:

<https://www.ncasi.org/technical-studies/sustainable-manufacturing/life-cycle-assessment/>  
(Last Viewed 6 Nov 2019)

## What is Embodied Energy?

**Embodied Energy** is the energy used during the entire life cycle of a product, including its manufacture, transportation, and disposal, as well as the *inherent energy captured within the product itself.*

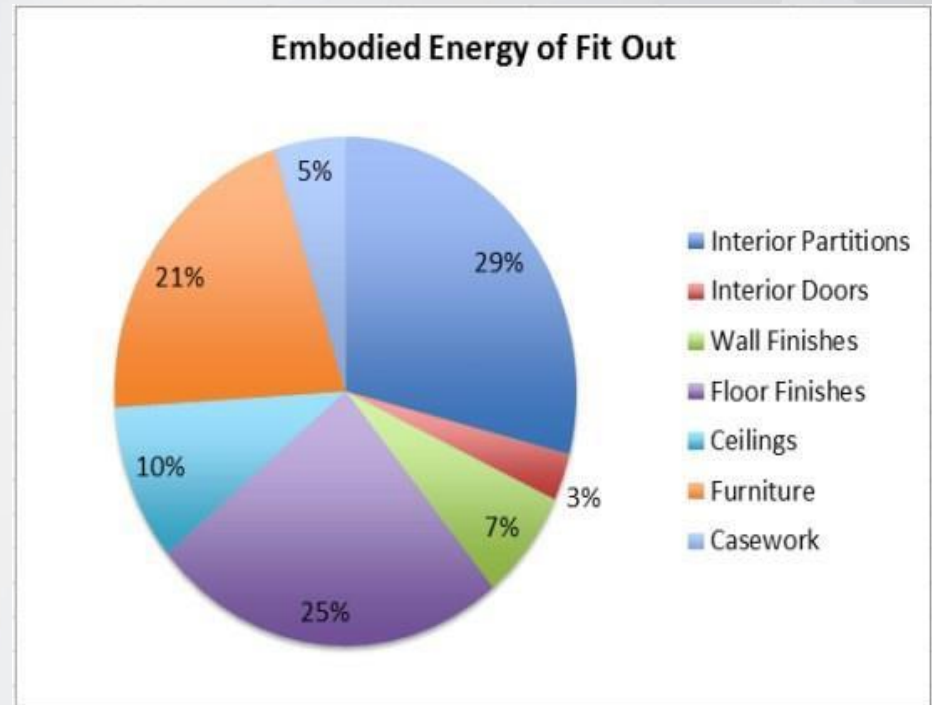


Image source:

<http://www.fmlink.com/ProfResources/Sustainability/Articles/images/sustainability092812a3.jpg>



## Construction/Demolition Waste Management Plan

# Embodied Energy of Building Materials

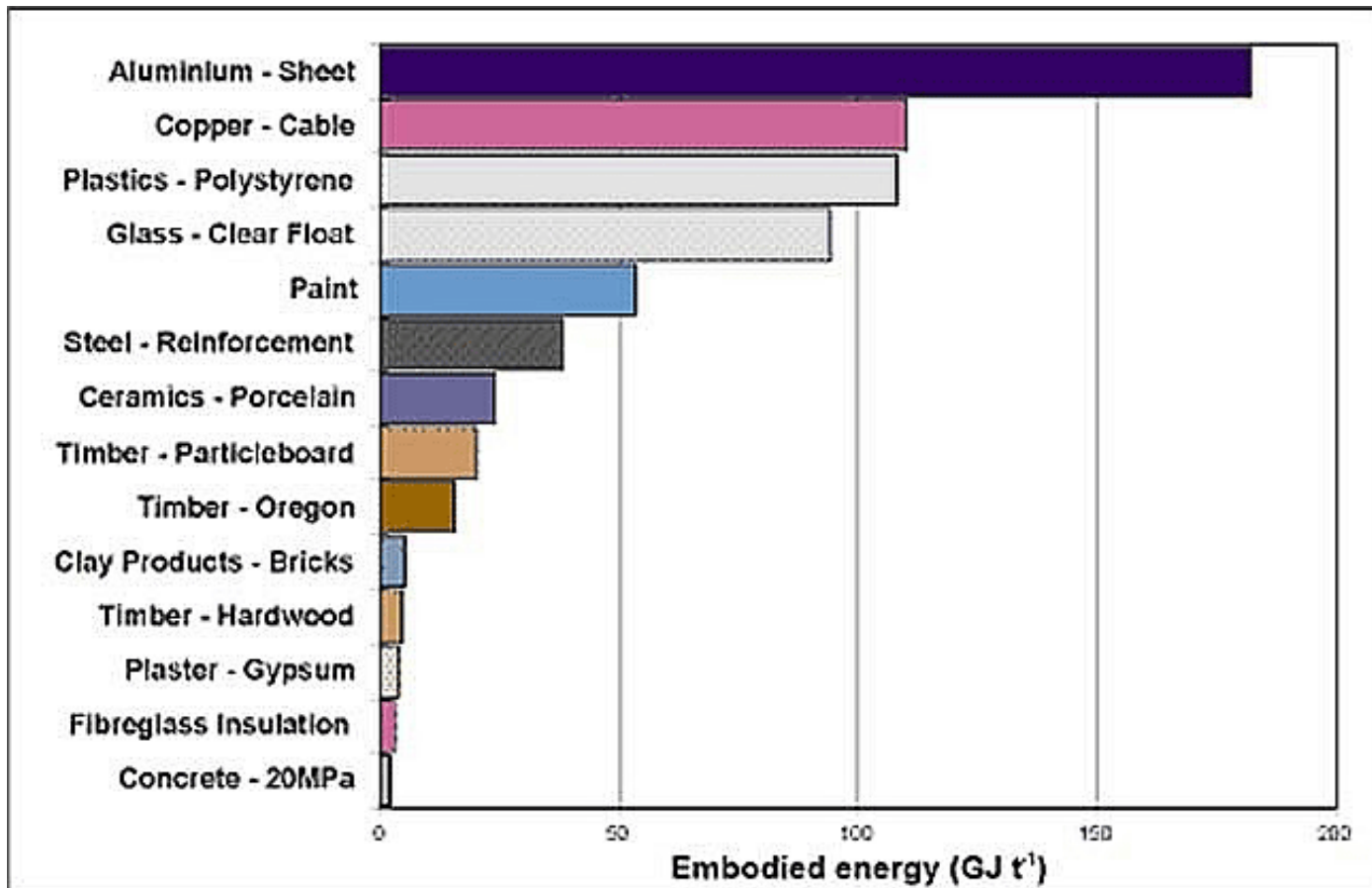


Image source:

Tucker, Selwyn (2001).  
 "The Embodied Energy in  
 Buildings"(Last Viewed 24<sup>th</sup>  
 April 2018)

# MW 11 ADAPTABILITY AND DECONSTRUCTION

Credit: 1+1B add NB v1.2 MA 4

## EXTENT OF APPLICATION

All buildings.

## OBJECTIVE

- Encourage the design of building interior elements and building services components that allow modifications to space layout, and to reduce waste during churning, refurbishment and deconstruction.

## REQUIREMENT

- 1 credit where it can be demonstrated that applicable good practices in respect of
  - (a) Spatial Adaptability or
  - (b) Flexible Engineering Services or
  - (c) Structural Adaptability
- have been adopted whenever feasible and at least 20% for residential development and 70% for non-residential development
- of the listed items in the checklist could be achieved
- 1 additional BONUS credit for compliance with requirements listed in sub-item (a), (b) and (c).

## HIGHLIGHTS

- Applicability of the listed items to different building types is indicated in the checklists.

# MW 11 ADAPTABILITY AND DECONSTRUCTION

Credit: **1+1B add** NB v1.2 MA 4

## a.) Spatial adaptability

1. use of adaptable floor plans, including large grids that can be subdivided, etc.;
2. spaces designed for a loose fit rather than tight fit;
3. inclusion of multifunctional spaces;
4. design that allows interior fitting-out to use modular and pre-fabricated components;
5. spaces designed such that minimum disruption will be caused to occupants due to physical change;
6. easy relocation of partition walls that causes minimum damage to flooring or ceiling systems;
7. partition walls are fully salvageable;
8. separating long-lived components from short-lived components to reduce the complexity of deconstruction and churning so as to facilitate the collection process for recycling;
9. use of interior partitions that are demountable, reusable and recyclable, etc.

Percentage of checklist's requirement fulfilled: %



## Item 9:

**Use of interior partitions that are demountable, reusable and recyclable, etc.**



# MW 11 ADAPTABILITY AND DECONSTRUCTION

Credit: **1+1B add** NB v1.2 MA 4

## b.) Flexible engineering services

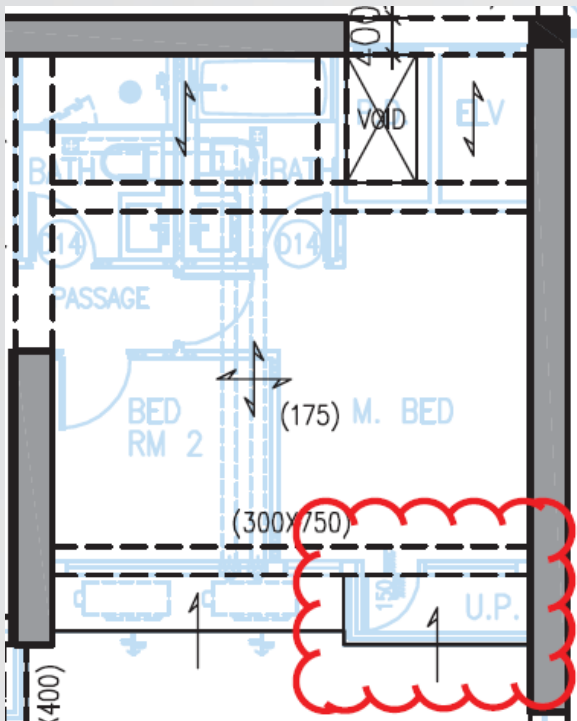
1. design that allows interior fitting-out to use modular and pre-fabricated components;
2. using hybrid HVAC systems, with a balance between centralised components and distributed components;
3. luminaires are easily relocated within ceiling grid or uplighters are used;
  
4. air diffusers on flexible ducts can be relocated at minimum cost with minimum disruption to occupants;
5. exhaust air ducts for special exhausts are easy to install, and space and capacity are available in ceiling and duct shafts;
6. sprinkler heads are easily relocated within ceiling grid;
7. pre-wired horizontal distribution systems in ceilings or floors, with spare capacity and easy access to accommodate change of workplace layouts;
8. reducing the use of embedded infrastructure for power, data and HVAC systems, etc.

Percentage of checklist's requirement fulfilled:            %



# MW 11 ADAPTABILITY AND DECONSTRUCTION

Credit: **1+1B add** NB v1.2 MA 4



## c.) Structural adaptability

1. foundations allow for potential vertical expansion of the building;
2. installation of isolation joints or other features avoid the potential for differential settlements and for progressive collapse due to accidental loading;
3. reliance on a central core for lateral load resistance that allows for local modifications to the structure while maintaining complete structural integrity;
4. wide structural grids;
5. lower floors allow for heavier live load;
6. sufficient height to lower floors to enable a range of uses;
7. building envelope is independent of the structure (i.e., functionally discrete systems, with the interfaces designed for separation);
8. versatile envelope capable of accommodating changes to the interior space plan;
9. means for access to the exterior wall system from inside the building and from outside;
10. structural floor system that accommodates a number of mechanical and electrical service distribution schemes based on different occupancies;
11. provision of more than the minimum spatial areas and floor heights, etc.

Percentage of checklist's requirement fulfilled: %

### Item 9:

**The façade system can be accessed to exterior wall system from interior and from outside through utility platforms by using gondola system.**

# THANK YOU

Notes:

- 1) The training material, including any explanation, discussion and resolution, shall be treated as “Confidential information”.
- 2) The material is for the sole purpose of training of BEAM Assessor. Do not quote any information in your submission in the business of BEAM Pro.
- 3) The material is for personal study only. Do not distribute to any third party.