

TOPIK 1

1.3 Bangunan Hijau *Green Building*

**Program Sijil Teknologi Senibina
Kolej Komuniti Kementerian Pendidikan Tinggi**

Green Building



Kajian antarabangsa membuktikan bahawa bangunan hijau menggunakan kurang tenaga, air dan menghasilkan kurang bahan buangan dan mewujudkan persekitaran yang sihat dan produktif kepada manusia.

World Green Building Council

Apa Itu Bangunan Hijau?

- **DEFINISI:** bangunan yang bercirikan teknologi binaan mesra alam semulajadi bermula dari lakaran pembinaan, operasi, selenggara sehingga peringkat pengubahsuaian.
- **TUJUAN :** mengurangkan kesan terhadap alam sekitar dan kesihatan manusia akibat daripada kepesatan pembangunan.
- **TUMPUAN:** kecekapan penggunaan tenaga, air dan bahan mentah.
- **MANFAAT:** jimat/kurangkan kos operasi, memulihara alam sekitar dan meningkatkan nilai hak milik bangunan.

Green Building Council

- Sistem Rating (penilaian) disediakan oleh Green Building Council yang ada di negara-negara tertentu yang sudah mengikuti gerakan bangunan hijau.
- USA : LEED (Leadership Efficiency Environment Design)
- Singapore: GreenMark
- Australia: GreenStar.
- Malaysia: Green Building Index (GBI) by Green Building Sdn Bhd, GreenPASS by CIDB dan pHJKR (Penarafan Hijau JKR) oleh Jabatan Kerja Raya Malaysia.
- Green building Indeks (GBI) telah dirangka oleh Pertubuhan Arkitek Malaysia (PAM) dan The Association of Consulting Engineers Malaysia (ACEM)

Green Building Index (GBI)

Bagaimana mendapatkan Sijil GBI?

- Melalui proses penilaian dan verifikasi oleh badan yang dilantik oleh Green Building Index Malaysia Sdn. Bhd
- Setiap kriteria rekabentuk bangunan yang memenuhi syarat minima kriteria GBI akan dinilai dan diberi point
- 4 jenis Rating: Certified, Silver, Gold and Platinum
- *Reassessment*: 3 tahun sekali untuk mengekalkan sijil

6 Kriteria GBI**

1. **Energy Efficiency (EE)**—tenaga solar atau tenaga yang boleh diperbaharui (renewable energy), sistem penyelenggaraan yang mampan (sustainable maintenance)
2. **Indoor Environment Quality (EQ)** –kualiti udara, pencahayaan, visual dan keselesaan akustik (acoustic comfort);
3. **Sustainable Site Planning And Management (SM)** - sistem pengurusan air larian (stormwater management);
4. **Material and Resources (MR)**- jenis bahan yang digunakan, penggunaan bahan-bahan kitar semula dan *construction waste management* yang mampan;
5. **Water Efficiency (WE)**—rainwater harvesting, penggunaan semula air (water recycling) dan water efficient in landscaping and water efficient fittings ;
6. **Innovation (IN)**- inovasi bangunan dalam reka bentuk serta inisiatif environmental design yang digunakan di dalam mereka bentuk

Green Building

 **GREENING MALAYSIA**
Over 26 Million Square Feet of Green Building in 3 years



01 BUILDING APTM 1 (MNC) | 02 BANGSA BANGSA (MNC) | 03 BANGSA BANGSA (MNC) | 04 BANGSA BANGSA (MNC) | 05 BANGSA BANGSA (MNC) | 06 BANGSA BANGSA (MNC) | 07 BANGSA BANGSA (MNC) | 08 BANGSA BANGSA (MNC) | 09 BANGSA BANGSA (MNC) | 10 BANGSA BANGSA (MNC) | 11 BANGSA BANGSA (MNC) | 12 BANGSA BANGSA (MNC) | 13 BANGSA BANGSA (MNC) | 14 BANGSA BANGSA (MNC) | 15 BANGSA BANGSA (MNC) | 16 BANGSA BANGSA (MNC) | 17 BANGSA BANGSA (MNC) | 18 BANGSA BANGSA (MNC) | 19 BANGSA BANGSA (MNC) | 20 BANGSA BANGSA (MNC) | 21 BANGSA BANGSA (MNC) | 22 BANGSA BANGSA (MNC) | 23 BANGSA BANGSA (MNC) | 24 BANGSA BANGSA (MNC) | 25 BANGSA BANGSA (MNC) | 26 BANGSA BANGSA (MNC) | 27 BANGSA BANGSA (MNC) | 28 BANGSA BANGSA (MNC) | 29 BANGSA BANGSA (MNC) | 30 BANGSA BANGSA (MNC) | 31 BANGSA BANGSA (MNC) | 32 BANGSA BANGSA (MNC) | 33 BANGSA BANGSA (MNC) | 34 BANGSA BANGSA (MNC) | 35 BANGSA BANGSA (MNC) | 36 BANGSA BANGSA (MNC) | 37 BANGSA BANGSA (MNC) | 38 BANGSA BANGSA (MNC) | 39 BANGSA BANGSA (MNC) | 40 BANGSA BANGSA (MNC) | 41 BANGSA BANGSA (MNC) | 42 BANGSA BANGSA (MNC) | 43 BANGSA BANGSA (MNC) | 44 BANGSA BANGSA (MNC) | 45 BANGSA BANGSA (MNC) | 46 BANGSA BANGSA (MNC) | 47 BANGSA BANGSA (MNC) | 48 BANGSA BANGSA (MNC)



Energy Commission of Malaysia Diamond Building (NR Architect/ IEN Consultants)

- *photovoltaic (PV) solar panels* – menyumbang 10% tenaga solar
- Rekabentuk *inverted pyramid* – ruang bumbung dan fasad yang lebih besar untuk pemasangan panel solar; laman di bawah menjadi lebih luas untuk lanskap (hijau)
- *Large Central Atrium* – membenarkan pencahayaan semulajadi masuk menerusi “an automatic roller-blind system responsive to the intensity as well as the angle of the incident sunlight,”

Green Building iNDEX



GBI ASSESSMENT CRITERIA
FOR
RESIDENTIAL NEW CONSTRUCTION (RNC)

VERSION 3.0 | JULY 2013

ASSESSMENT CRITERIA MAXIMUM ACHIEVABLE POINTS

PART	ITEM	MAXIMUM POINTS	SCORE
1	Energy Efficiency (EE)	23	
2	Indoor Environmental Quality (EQ)	12	
3	Sustainable Site Planning & Management (SM)	33	
4	Material & Resources (MR)	12	
5	Water Efficiency (WE)	12	
6	Innovation (IN)	8	
TOTAL SCORE		100	

CATEGORIES OF GREEN BUILDING INDEX RATING

POINTS	GBI RATING
86 to 100 points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

DEFINITIONS OF LANDED, LOW-RISE AND HIGH-RISE

Landed : Single Owner (Townhouse is included in this category)

Low-rise : Strata Building in which the topmost floor is \leq 18.3m above ground level

High-rise : Strata Building in which the topmost floor is $>$ 18.3m above ground level

SUMMARY OF ASSESSMENT CRITERIA AND POINTS

PART	CRITERIA	ASSESSMENT CRITERIA	POINTS	TOTAL
1	EE	ENERGY EFFICIENCY		23
	Design			
	EE1	Minimum EE Performance (Mandatory Compliance)	1	
	EE2	Advanced EE Performance	12	
	EE3	Renewable Energy	5	
	Energy Efficiency			
	EE4	External Lighting and Control	2	
	EE5	Internet Connectivity	1	
	Maintenance			
EE6	Sustainable Maintenance and Building User Manual (BUM)	2		
2	EQ	INDOOR ENVIRONMENTAL QUALITY		12
	Air Quality			
	EQ1	Minimum Indoor Air Quality Performance	3	
	EQ2	Volatile Organic Compounds Minimisation	2	
	EQ3	Formaldehyde Minimisation	1	
	Lighting, Visual and Acoustic Comfort			
	EQ4	Daylighting	3	
	EQ5	External Views	1	
	EQ6	Sound Insulation	1	
Evaluation				
EQ7	Post Occupancy Evaluation	1		
3	SM	SUSTAINABLE SITE PLANNING & MANAGEMENT		33
	Site Planning			
	SM1	Site Selection & Planning	1	
	SM2	Re-habilitation of Brownfield Sites OR Re-development of Existing Buildings	1	
	SM3	Community Connectivity	4	
	Construction Management			
	SM4	Earthworks – Construction Activity Pollution Control	1	
	SM5	QLASSIC – Quality Assessment System For Building Construction Work	1	
	SM6	Workers' Site Amenities	1	
	SM7	IBS – Industrialised Building System	2	
	Transportation			
	SM8	Public Transportation Access	8	
	SM9	Dedicated Cycling Network	2	
	Design			
	SM10	Stormwater Design – Quantity and Quality Control	3	
SM11	Heat Island Effect – Greenscape and Water Bodies	5		
SM12	Heat Island Effect – Hardscape	2		
SM13	Heat Island Effect – Roof	1		
SM14	Composting	1		

Green Building iNDEX

GREEN BUILDING INDEX ASSESSMENT CRITERIA FOR RNC

PART	CRITERIA	ASSESSMENT CRITERIA	POINTS	TOTAL
4	MR	MATERIALS & RESOURCES		
	Reused & Recycled Materials			12
	MR1	Materials Reuse And Selection	2	
	MR2	Recycled Content Materials	2	
	Sustainable Resources			
	MR3	Regional Materials	2	
	MR4	Sustainable Timber	2	
	Waste Management			
MR5	Storage and Collection of Recyclables	2		
MR6	Construction Waste Management	2		
5	WE	WATER EFFICIENCY		
	Water Harvesting & Recycling			12
	WE1	Rainwater Harvesting	4	
	WE2	Waste Water Recycling	2	
	Increased Efficiency			
	WE3	Water Efficient Irrigation and Landscaping	2	
WE4	Water Efficient Fittings	4		
6	IN	INNOVATION		
	IN1	Innovation in Design and Environmental Design Initiatives	7	8
	IN2	Green Building Index Facilitator (GIBF)	1	
TOTAL POINTS				100

Sekian.

Terima kasih.

