

Green Building - Beyond What You Know

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Green Building and Citizenship and Social Development



https://www.edb.gov.hk/attachment/tc/curriculum-development/renewal/CS/CS_CAG_S4-6_Chi_2021.pdf

What is Green Building?

Within the building life cycle, green buildings can **reduce impact to the environment** and **enhance the health and wellbeing of building occupants**.



The Concept of Green Building

- Save energy and water with efficient utilisation of resources to avoid profligacy
- Utilise renewable energy and eco-friendly construction materials to reduce carbon footprint and carbon emissions
- Reduce the production of waste and pollution of water, air, acoustics and land
- Achieve natural ventilation, lighting, enhancement of indoor air quality via building designs to provide better indoor environment for building occupants







Hong Kong's Unique Built Environment



>42,000 buildings in private sector





People live and work in 24% of HK's total area



About 12,188 high-rise buildings and skyscrapers Our activities in buildings account for 90% electricity consumption or 60% greenhouse gas emissions



Average population density of built-up areas 28,000 persons/km²

Why Green Building?

Why do we build?

• Longer Asset Life

- Increase asset value
- Improve the Ability to Secure Finance
- Enhance Corporate Social Responsibility

17.71

Why do we choose?

- Enjoy Green Living
- Enhance Corporate Image
- Enhance Productivity
- Safeguard Health and Wellbeing

Developer / Owner

Reduce Life Cycle Cost

Building Users

Green Building Certification

Green building certification system is an independent tool to showcase and compare

the environmental performance of buildings.

For example:

- BREEAM for United Kingdom
- "BEAM Plus" for Hong Kong



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BREEAM

Hong Kong Green Building Council: Certification Body

BEAM Society Limited: Assessment Body



, LEED for United States

BEAM Plus – a Holistic Assessment for Buildings

BEAM Plus is a voluntary green building assessment scheme developed locally for compact high-rise development in the subtropical region



Assessment Aspects of BEAM Plus



Examples for BEAM Plus New Buildings



InnoCell Hong Kong Science Park

New Buildings V1.2, Final Platinum



Xiqu Centre

New Buildings V1.2, Final Gold

GOVERNMENT, INSTITUTIONAL AND COMMUNITY





Hong Kong Children's Hospital

New Buildings V1.2, Final Platinum

GOVERNMENT, INSTITUTIONAL AND COMMUNITY

Examples for BEAM Plus Existing Buildings



Langham Place – Retail Tower

Existing Buildings V2.0, Final Platinum

COMMERCIAL

Electrical and Mechanical Services Department Headquarters

Existing Buildings V1.2, Final Platinum



GOVERNMENT, INSTITUTIONAL AND COMMUNITY



EcoPark Existing Buildings V2.0 (Selective Scheme) Excellent

GOVERNMENT, INSTITUTIONAL AND COMMUNITY

Examples for BEAM Plus Neighbourhood and Interiors



Kai Tak Sports Park

Neighbou<mark>rhoo</mark>d V1.0, Platinum

MIXED USE

Yuen Long Effluent Polishing Plant Neighb MIXED USE



Examples for BEAM Plus Interiors



Construction Industry Council

Interiors V1.0, Platinum



The Building Information Centre at the New Headquarters of the Buildings Department Interiors V1.0, Platinum

GOVERNMENT, INSTITUTIONAL AND COMMUNITY





Shell Siu Lam Station Interiors V1.0, Final Gold





What is a green school?

"A green school is about more than curriculum and <u>more than</u> <u>bricks and mortar</u>. It's a school where the <u>community</u> works together to support <u>global sustainability</u> and <u>climate action</u>. A green school prepares students to <u>lead the world</u> toward a <u>healthier, cleaner, more sustainable future.</u>"

(Center for Green Schools, USGBC)



Three pillars of a green school

- 1. Reduce environmental impacts and costs.
- 2. Improve occupants' health and performance.
- 3. Effective sustainability education.



Sustainable Leadership and Learning (SLL) 可持續領導及學習

- High Level Commitment 領導人員對實踐的承諾
- Environmental Learning 環境學習
- Engagement 參與/交流

Efficient Use c 有效資源運用 Efficient Use of Resources (EUR)

- Decarbonisation Actions 減碳行動
- Benchmarking and Disclosure 基準及披露









GREEN

綠建學校 [5 既和

HKGBC BEMMPlus 緑建環評

and Learning (SLL) 可持續領導及學習

Efficient Use of Sustainable Campus Resources (EUR) Environment (SCE) 有效資源運用 可持續校園環境



Health, Comfort & Happiness (HCH) 健康,舒適,快樂

HKGBC

BEMM Plus



BEAM Plus Existing Schools

綠建環評既有學校

Sustainable Campus Environment (SCL 可持續校園環境

- Biophilla
- 親生物設計
- Neighbourhood Integration 鄰里共融
- Climate resilience 氣候抗禦力/復元力

Health, Comfort & Happiness (HCH) 健康,舒適,快樂

- Healthy Indoor Environment 健康室內環境
- Healthy living 健康生活
- Health Protection 健康保障

Innovations and Additions (IA) 創新

 Innovations and Additions 創新

Framework





Sustainable Leadership and Learning (SLL) 可持續領導及學習



Efficient Use of Resources (EUR) 有效資源運用 Sustainable Campus Environment (SCE) 可持續校園環境



Health, Comfort & Happiness (HCH) 健康,舒適,快樂

Assessment Criteria

Summary Table of Documentation Requirements					
		6			
Credit Heads	Drawings	Records	Technical	Management	Narratives
SLL-01-01 Environmental Policy, Plan and Target		•		•	•
SLL-01-02 Good Environmental Practices					•
SLL-02-01 Staff Awareness		•			
SLL-02-02 Green Prefect		•			•
SLL-02-03 Extended Environmental Education					•
SLL-02-04 Other Learning Experiences		•			•
SLL-03-01 Environmental Corner		•			
SLL-03-02 Environmental Communication					•
EUR-01-01 Energy Efficient Equipment	•	•	•		•
EUR-01-02 Energy Efficient Measures			•		
EUR-01-03 Renewable Energy		•			•
EUR-01-04 Water Efficient Fixtures		•	•		
EUR-01-05 Water Efficient Measures			•		
EUR-01-06 Recycling Facilities		•			
EUR-02-01 School Environmental Performance		•	•		
EUR-02-02 Carbon Audit			•		
EUR-02-03 Data Disclosure		•		٠	
SCE-01-01 Campus Greening			•		
SCE-01-02 Agriculture Education		•			•
SCE-02-01 Low Carbon Commuting	•	•			
SCE-02-02 Neighbourhood Amenities	•	•			•
SCE-02-03 Shared-Use Facilities	•			•	
SCE-03-01 Response to Extreme Weather					•
HCH-01-01 Healthy Air	•	•	•		•
HCH-01-02 Openable Windows	•	•	•		•
HCH-01-03 Illuminance Levels			•		
HCH-01-04 Background Noise			•		
HCH-02-01 Drinking Water Quality	•		•		
HCH-02-02 Healthy Lifestyle		•			•
HCH-03-01 Health Protection Measures					•
IA-01-01 Innovations and Additions					•

	Performance Category	ce Category Performance Sub-Category Credit Head Items		ems	Credit Point(s)	
		High Level Commitment	SLL-01-01 SLL-01-02	Environmental Policy, Plan and Target Good Environmental Practices	6	
	Sustainable Leadership and Learning (SLL)	Environmental Learning	SLL-02-01 SLL-02-02 SLL-02-03 SLL-02-04	Staff Awareness Green Prefect Extended Environmental Education Other Learning Experiences		33
1		Engagement	SLL-03-01 SLL-03-02	Environmental Corner Environmental Communication		
	0					
	Efficient Use of Resources (EUR)	Decarbonisation Actions	EUR-01-01 EUR-01-02 EUR-01-03 EUR-01-04 EUR-01-05 EUR-01-06	Energy Efficient Equipment Energy Efficient Measures Renewable Energy Water Efficient Fixtures Water Efficient Measures Recycling Facilities	60000	36
		Benchmarking and Disclosure	EUR-02-01 EUR-02-02 EUR-02-03	School Environmental Performance Carbon Audit Data Disclosure		
					- 0	
	(Cate of the second sec	Biophilia	SCE-01-01	Campus Greening	S	
		Neighbourhood	SCE-01-02	Low Carbon Commuting	- 8	
	Sustainable Campus Environment (SCE)	Integration	SCE-02-02 SCE-02-03	Neighbourhood Amenities Shared-Use Facilities		15
		Climate Resilience	SCE-03-01	Response to Extreme Weather	6	
	629	Healthy Indoor Environment	HCH-01-01 HCH-01-02	Healthy Air Openable Windows		
			HCH-01-03	Illuminance Levels	0	
	Health, Comfort	Healthy Living	HCH-01-04	Background Noise	- 8	16
	a nappiness (non)	Healthy Living	HCH-02-01	Healthy Lifestyle	ĕ	
		Health Protection	HCH-03-01	Health Protection Measures	6	
					-	
	Innovations and Additions	Innovations and Additions	IA-01-01	Innovations and Additions	(10B)	
				Total Credit Points 10	0+ 10B	

Resources



HKGBC 香港經色建築議會 BE

建築環保評估協會









hereby certifies that 特 此 證 明

St. Paul's College 聖保羅書院 69 Bonham Road, Hong Kong 般咸道69號

has achieved **Green** rating under BEAM Plus Existing Schools V1.0 Beta Version 獲得綠建環評既有學校 (1.0測試版本)「**緣建學校**」評級





hereby certifies that 特此證明

Ying Wa Primary School 英華小學 3 Ying Wa Street, Shamshuipo, Kawloon, Hong Kong 九龍梁水埗英華街三號

has achieved **Green** rating under BEAM Plus Existing Schools V1.0 Beta Version 獲得綠建環評既有學校 (1.0測試版本)「**綠建學校**」評級





Green Features







- Proper selection of building service equipment to reduce energy consumption, together with provision of PV system, resulting in 37.2% of annual energy & carbon emission reduction and 42.05% of maximum electricity demand reduction.
- Meters are installed, allowing monitoring of different building services installations, including MVAC, lighting & small power, lift and plumbing & drainage systems

TWGHs Tseng Hin Pei Primary School (東華三院曾憲備小學)



Po Leung Kuk Stanley Ho Sau Nan Primary School (保良局何壽南小學)

Green Features







- Energy efficient air-conditioning system (District Cooling System) was adopted to reduce annual airconditioning energy consumption
- Double-glazing was used for the
 building, as well as architectural fins,
 trellises and balconies to provide
 shading in order to lower energy
 consumption for air-conditioning.
 - Solar photovoltaic panels were installed on the roof to harvest solar energy.



Hong Kong International School, Lower Primary School

Green Features





- High efficient water-cooled chiller
 system was adopted for the
 redevelopment, which also provides
 district cooling to the opposite
 Upper Primary School building within
 the Repulse Bay Campus.
 - Low-E coated double-glazing was used for the building, as well as **architectural fins, trellises and balconies** to provide shading in order to lower energy consumption for airconditioning.

Framework





Sustainable Leadership and Learning (SLL) 可持續領導及學習



Efficient Use of Resources (EUR) 有效資源運用 Sustainable Campus Environment (SCE) 可持續校園環境



Health, Comfort & Happiness (HCH) 健康,舒適,快樂

Green School Bali (Indonesia)



GREEN 綠建學校

	High Level Commitment	ient SLL-01-01 Environmental Policy, Pla	
R		SLL-01-02	Good Environmental Practices
	Environmental Learning	SLL-02-01	Staff Awareness
Sustainable		SLL-02-02	Green Prefect
Leadership and		SLL-02-03	Extended Environmental Education
Learning (SLL)		SLL-02-04	Other Learning Experiences
	Engagement	SLL-03-01	Environmental Corner
		SLL-03-02	Environmental Communication

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Built in the Jungle



Bamboo Architecture

Source: https://www.youtube.com/@greenschoolbali

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Efficient Use of Resources (EUR)

Decarbonisation Actions	EUR-01-01	Energy Efficient Equipment
	EUR-01-02	Energy Efficient Measures
	EUR-01-03	Renewable Energy
	EUR-01-04	Water Efficient Fixtures
	EUR-01-05	Water Efficient Measures
	EUR-01-06	Recycling Facilities
Benchmarking and	EUR-02-01	School Environmental Performance
Disclosure	EUR-02-02	Carbon Audit
	EUR-02-03	Data Disclosure

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Green Transportation

Source: https://www.youtube.com/@greenschoolbali

green school

BIO BUS

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Renewable Energy

Renewable Energy

GREEN SCHOOL RECIEVED THE ZAYED FUTURE ENERGY PRIZE FOR THEIR PROPOSAL:



GREEN 線建學校 ^{55 既有学校} HKGBC BE@M Plus 線建環評

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GREEN 綠建學校

Sustainable Campus
Environment (SCE)

Biophilia	SCE-01-01	Campus Greening
	SCE-01-02	Agriculture Education
Neighbourhood	SCE-02-01	Low Carbon Commuting
Integration	SCE-02-02	Neighbourhood Amenities
	SCE-02-03	Shared-Use Facilities
Climate Resilience	SCE-03-01	Response to Extreme Weather

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Environmental Corner

griculture Education (farming)

Mindful Eating



Source: https://www.youtube.com/@greenschoolbali

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	Healthy Indoor	HCH-01-01	Healthy Air	()
	Environment	HCH-01-02	Openable Windows	
		HCH-01-03	Illuminance Levels	
Health, Comfort		HCH-01-04	Background Noise	
& Happiness (HCH)	Healthy Living	HCH-02-01	Drinking Water Quality	
		HCH-02-02	Healthy Lifestyle	6
	Health Protection	HCH-03-01	Health Protection Measures	5

Circadian Rhythms



Source: Nature Reviews



Source: s-media-cache-ak0.pinimg.com



Source: Nature Reviews

Natural Lighting

Source: https://www.voutube.com/@greenschoolbali

Circadian Rhythms Colour Temperature

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Source: Heavn One

INSOMNIA

- Irritability
- Cognitive impairment
- Memory lapses or loss
- Impaired moral judgement
- Severe yawning
- Hallucinations
- Symptoms similar to ADHD
- Impaired immune system
- Risk of diabetes -Type 2

Source: http://www.canyon-news.com/

- Increased heart rate variability
- r- Risk of heart disease
 - Increased reaction time
 - Decreased accuracy
 - Tremors
 - Aches

Other:

- Growth suppression
- Risk of obesity
- Decreased temperature

Small Group Discussion

KEN SCHOOL SKELLS

Active Learning

Source: https://www.youtube.com/@greenschoolbali

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GREEN SCHOOL SKILLS

Learning Commons

Physical Inactivity

"Physical inactivity poses one of the biggest modern threats to public health. It is an <u>independent risk factor</u> for numerous chronic diseases and is estimated to be responsible for 30% of ischemic heart disease, 27% of type 2 diabetes and 21-25% of breast and colon cancer cases. Lack of physical activity can also increase the odds of having a stroke by 20-30% and shave off 3-5 years of life."

– WELL Building Standard



Source: www.wellcertified.com

Physical Inactivity



Source: www.wellcertified.com

Project-based Learning

Source: https://www.youtube.com/@greenschoolbali

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Source: https://www.youtube.com/@greenschoolbali

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Neighbourhood Amenities





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