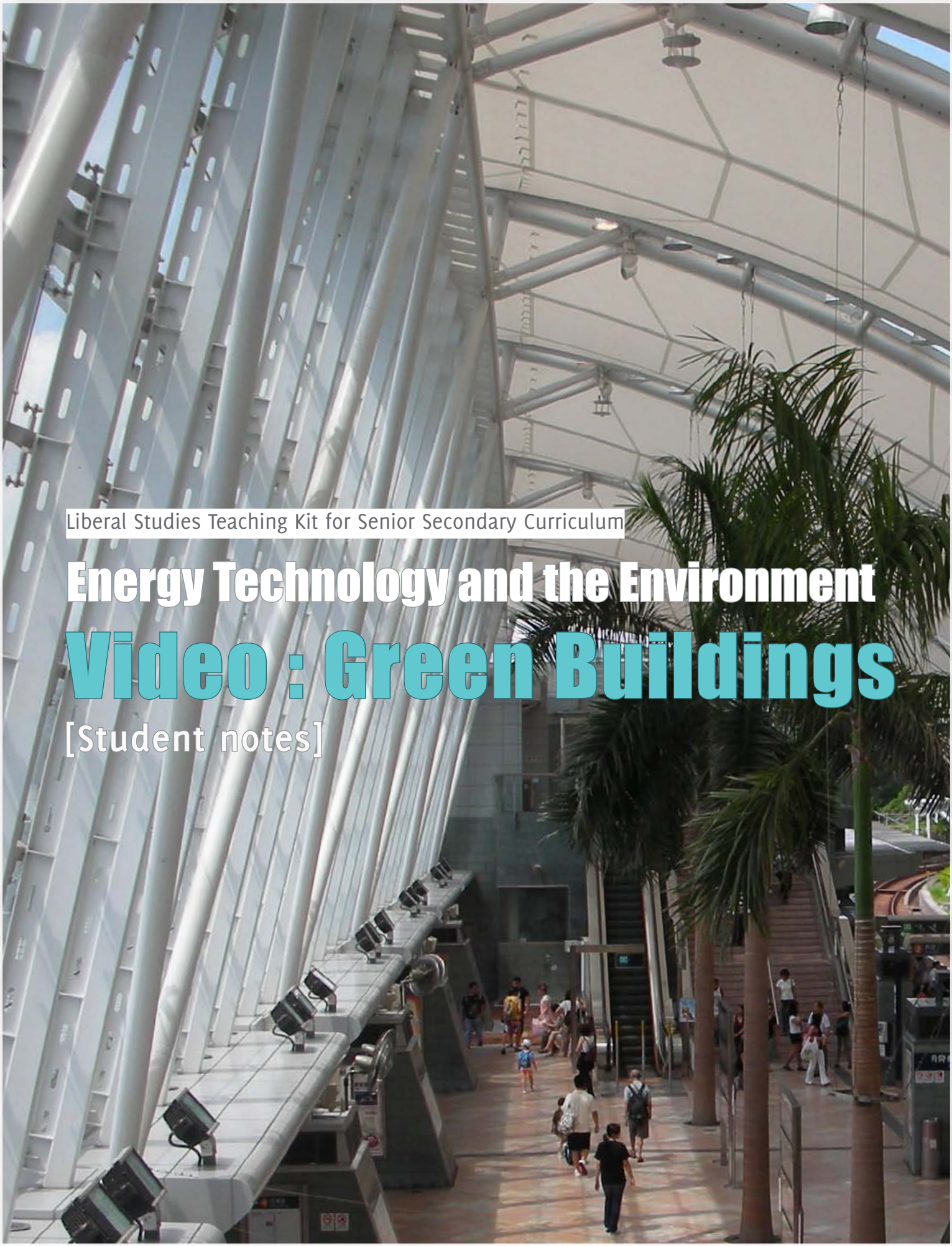

Liberal Studies Teaching Kit for Senior Secondary Curriculum

Energy Technology and the Environment

Video : Green Buildings

[Student notes]

Organizer

香港建築師學會
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Community Project Workshop 社區項目工作坊

Contents

Topic 07
Video: Green Buildings

Major teaching areas

Liberal Studies

Module 6 Energy Technology and the Environment

- Theme 2 : The environment and sustainable development

Related teaching areas

Liberal Studies

Module 1 Hong Kong Today

- Theme 1 : Quality of life
- Theme 2 : Rule of law and socio-political participation

Interdisciplinary Teaching Areas

Science

Physics

- Chapter VIII Energy and Use of Energy

Integrated Science

- C6 Balance in Nature

Learning objectives

- To understand green building design
- To learn about important statutory policy and voluntary guidelines on green architecture, especially as applied in Hong Kong
- To evaluate the contributions of the Government and private sectors to the environmental and sustainable development of Hong Kong through architectural design and urban planning
- To be able to assess how 'green' a building is through the exercise

Learning plan

Lesson	Contents
Lesson 1 Green architecture	• 1.1 Concepts of green buildings • 1.2 Statutory policy, guidelines and standards on green buildings • 1.3 Voluntary compliance with local and international green building standards

Lesson 1
Green Buildings

1.1 What are Green Buildings?

> In communities around the world, green building is offering real, measurable results in humanity's efforts to reduce our global carbon footprint and promote environmental, economic and social prosperity.
>
> - The U.S. Green Building Council (USGBC), 2011

1.1.1 Concepts of Green Building Design

The concept of green building is neither complicated nor technical. It simply refers to buildings that are designed, built, renovated, operated, and reused in an ecological and resource-efficient manner to meet certain objectives such as protecting occupants' health; improving employees' productivity; using energy, water, and other resources more efficiently; and reducing the overall impact to the environment.

1.1.2 Green Building Standards

According to the Building Environmental Assessment Method Plus (BEAM Plus), promoting green building standards can:

- stimulate the demand for more sustainable buildings in Hong Kong and other regions, giving recognition for improved performance and minimising false claims;
- provide a common set of performance standards that can be pursued by developers, designers, architects, engineers, contractors and operators;
- reduce the environmental impacts of buildings throughout planning, design, construction, management and demolition life cycle; and
- raise awareness in the building community, and ensure that environmental considerations are integrated right from the start rather than retrospectively

▲ Upper Estate in Ngau Tau Kok used environmental approaches in the overall planning and architectural design.

▲ Hong Kong Wetland Park is one of the most awarded environmentally-friendly designs in Hong Kong

1.2 Statutory Policy and Guidelines on Green Buildings

Since 1998, Electrical and Mechanical Services Department has implemented a voluntary 'Hong Kong Energy Efficiency Registration Scheme for Buildings' to promote energy efficiency in buildings.

In 2005, the Government issued a technical circular setting out the guidelines for all capital works projects and minor works projects on the adoption of energy efficient features and renewable energy technologies in Government projects and installations.

The Government is now working on legislation to make the implementation of building energy codes mandatory.

1.2.1 'Building Design to Foster a Quality and Sustainable Built Environment'

In 2009, the Council for Sustainable Development (SDC) launched a public engagement process entitled 'Building Design to Foster a Quality and Sustainable Built Environment' in collaboration with the Government. This is a voluntary scheme that

- encourages a proper balance between fulfilling environmental performance and comfort requirements of buildings on one hand,
- minimizes the impact on the surrounding environment as far as possible on the other, and
- ensures room for creativity in Hong Kong's building designs.

1.2.2 The Building (Energy Efficiency) Regulation 'B(EE)R' (Cap. 123) since 1995

For Further information, please visit:
http://www.legislation.gov.hk/blis_pdf.nsf/4f0db701c6c25d4a4825755c00352e35/25C2868DA2669A12482575EE003F079B/$FILE/CAP_123F_e_b5.pdf

1.2.3 The Buildings Energy Efficiency Ordinance (Cap. 610) enacted in November 2010

For further updates and information, please visit:
http://www.emsd.gov.hk/emsd/eng/pee/mibec_beeo.shtml
(Source: Hong Kong Government website)

▲ Diamond Hill Crematorium won the HKIA Green Award in 2010

1.3 Local and International Green Building Standards

Besides the local Government's promotion of green buildings, there are two standards commonly referred by international architects, designers, developers and engineers as guidelines:

- Building Environmental Assessment Method Plus (BEAM Plus) standards from Hong Kong
- Leadership in Energy and Environmental Design (LEED), created by the U.S. Green Building Council (USGBC)

1.3.1 BEAM Plus

What is BEAM Plus?

BEAM Plus (Building Environmental Assessment Method Plus) is the green building assessment system to measure, improve and label the environmental performance of buildings.

BEAM Plus is:

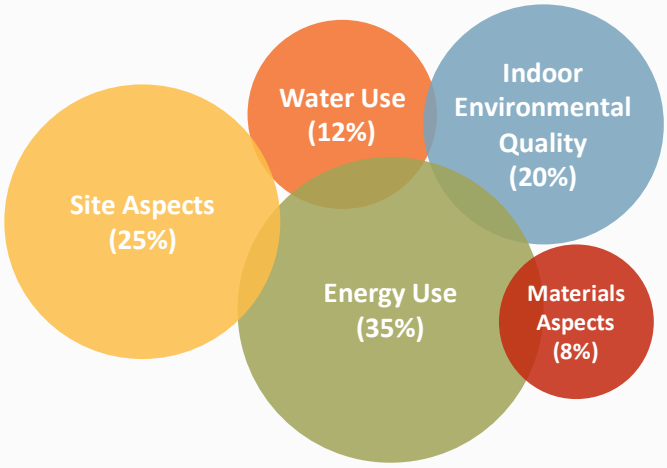
- The leading initiative to assess, improve, certify and label the environmental performance of buildings;
- A comprehensive standard and supporting process covering all building types, including mixed use complexes, both new and existing;
- A means by which to benchmark and improve performance;
- A voluntary scheme developed in partnership with, and adopted by the industry, at a level that makes it one of the leading schemes in the world; and
- A driver for and means by which to assure healthier, higher quality, more durable, efficient, and environmentally sustainable working and living environments, BEAM Plus is the green building assessment system to measure, improve and label the environmental performance of buildings.

Who uses BEAM Plus?

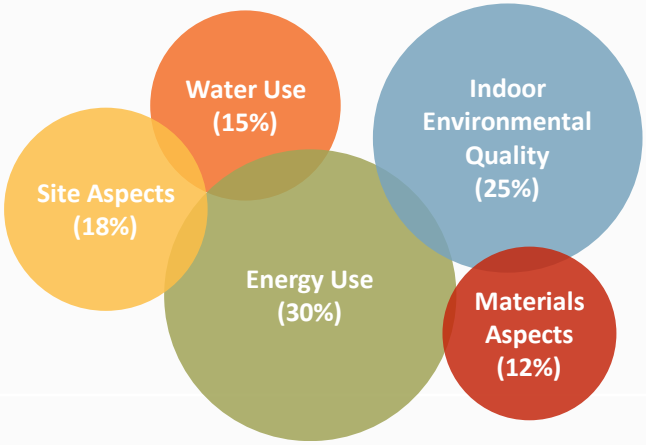
The client base is made up of private developers and landlords (commercial and residential premises), government departments (staff quarters, laboratory centre, magistrate and office buildings, technology parks and public record storage premises) academic and research institutions (student accommodations and campus office buildings), and other corporate clients with their own headquarter buildings (particularly banks and utilities). In terms of percentages, private and public sector buildings make up around 75% and 25% of all buildings assessed, respectively.

(Source: HKGBC, 2012)

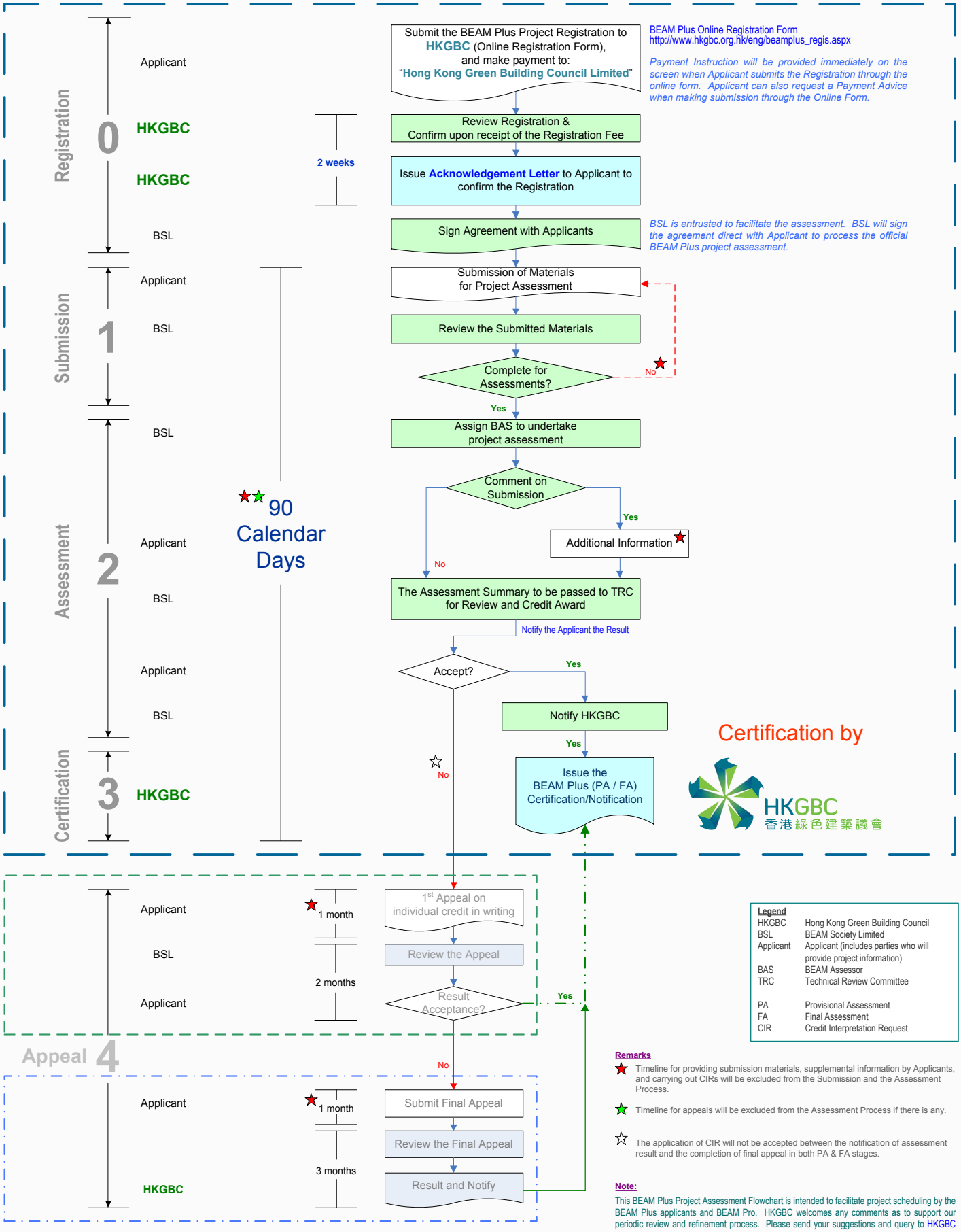
▶BEAM Plus for New Buildings assessment



▶BEAM Plus for Existing Buildings assessment



▼ BEAM Plus Building Assessment Process



Legend	
HKGBC	Hong Kong Green Building Council
BSL	BEAM Society Limited
Applicant	Applicant (includes parties who will provide project information)
BAS	BEAM Assessor
TRC	Technical Review Committee
PA	Provisional Assessment
FA	Final Assessment
CIR	Credit Interpretation Request

Remarks

★ Timeline for providing submission materials, supplemental information by Applicants, and carrying out CIRs will be excluded from the Submission and the Assessment Process.

★ Timeline for appeals will be excluded from the Assessment Process if there is any.

☆ The application of CIR will not be accepted between the notification of assessment result and the completion of final appeal in both PA & FA stages.

Note:

This BEAM Plus Project Assessment Flowchart is intended to facilitate project scheduling by the BEAM Plus applicants and BEAM Pro. HKGBC welcomes any comments as to support our periodic review and refinement process. Please send your suggestions and query to HKGBC Secretariat (beamplus_enquiry@hkgbc.org.hk) if you have any. Meanwhile, HKGBC and BSL would try our endeavors to adhere to the proposed timeline as stated.

Chart 1 BEAM Plus Assessment Process (Full Version can be downloaded from the HKGBC Website: http://www.hkgbc.org.hk/eng/beamplusmain.aspx)

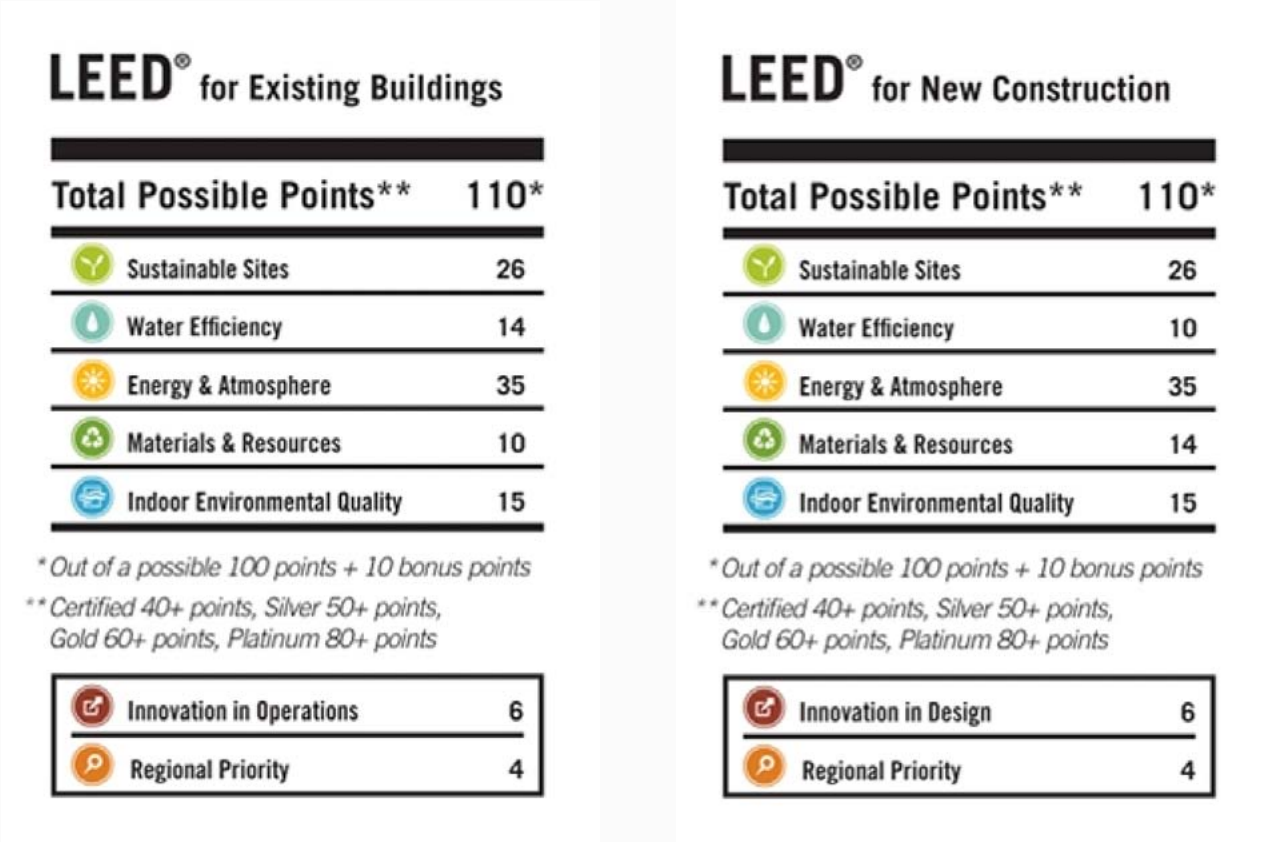
1.3.2 LEED

What is LEED?
LEED certification provides independent, third-party verification that a building, home or community was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health. LEED provides building owners and operators with a framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions.

Who uses LEED?
Diverse professionals, including architects, real estate professionals, facility managers, engineers, interior designers, landscape architects, construction managers, lenders and government officials all use LEED to help achieving a more sustainable built environment.

How does LEED certification work?
LEED points are awarded on a 100-point scale, and credits are weighted to reflect their potential environmental impacts. Additionally, 10 bonus credits are available, four of which address regionally specific environmental issues. A project must satisfy all prerequisites and earn a minimum number of points to be certified.

(Source: LEED, 2011)



▲ LEED Points Awarding Criteria

[Exercise 1]

Read the following news article and answer the questions.

Jones Lang LaSalle Awarded with Highest Global LEED® Platinum Score for Its New Office in Hong Kong

Jones Lang LaSalle, the real estate industry's leading firm, has recently set a new industry standard and achieved LEED® Platinum for its Hong Kong office located at Three Pacific Place, with the highest number of points of any certified project using the LEED for Commercial Interiors rating system in the world today. There are less than 580 LEED Platinum projects in the world, and in Asia Pacific, only 55 projects have been granted the certification. Jones Lang LaSalle Hong Kong not only earned LEED Platinum but, by earning 95 points, outscored all other certified projects using the LEED for Commercial Interiors rating system, beating the USGBC's own headquarters space by one point.

Jones Lang LaSalle's new 27,068-sq ft office at Three Pacific Place is located at the 5th and 6th floors and houses nearly 250 staff. The company sought to create a healthier and more productive workplace that is less costly to operate and has a reduced impact on the environment. To achieve this, a green-designed building was selected featuring high levels of natural daylight, an efficient layout and an adaptive control scheme to optimise energy consumption. Another focus for the project was to improve indoor air quality, which was achieved through carefully selected building materials during the renovation.

'The steps the team has taken have paid off tangibly, resulting in a 13% reduction in energy consumption per square foot. What's more important is that the improved air quality has made our office a healthier working environment; an analysis of sick days per employee during the first seven months of moving into the new premises translates into a 32% reduction in absenteeism. Although there are a number of reasons that could have contributed to the reduction, a healthier workplace is definitely one of the biggest factors in enhancing our productivity. We are extremely pleased with the result,' notes Gavin Morgan.

According to the USGBC, an upfront investment of 2% in green building design, on average, results in life cycle savings of 20% of the total construction costs—ten times the initial investment.

(Extract of the news release from Jones Lang LaSalle, 31 August 2011)

1 What green features are adopted in the Jones Lang LaSalle's new office?

2 What are the user benefits of being certified as 'Green Building'?

3 What are the commercial benefits for investing green features in architecture?

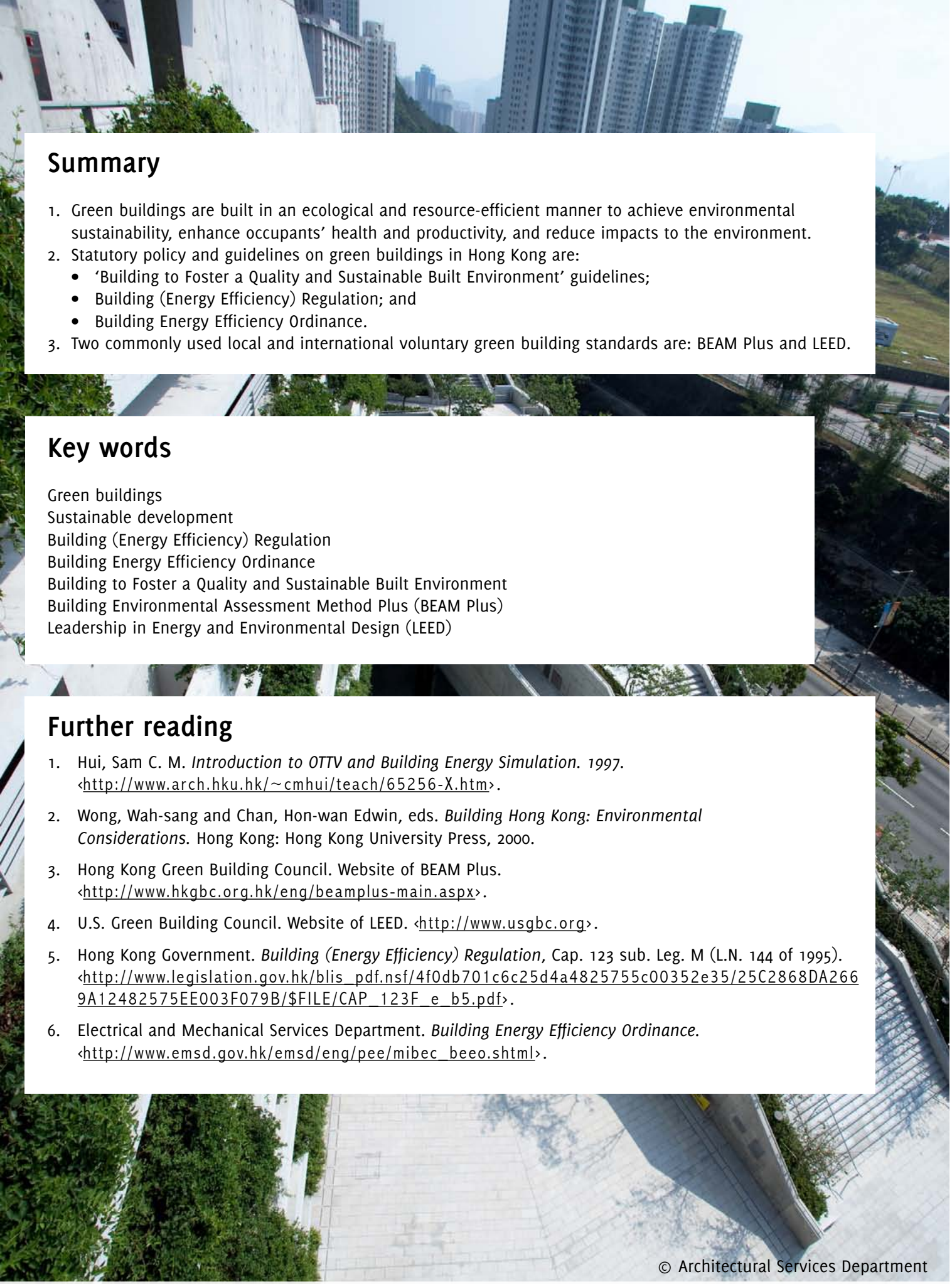
4 Do you think the new Building Energy Efficiency Ordinance is sufficient to transform Hong Kong into a green city?

5 Why is green development in Hong Kong relatively slow, compared to other developed countries like the U.S. and Japan?

[Exercise 2]

Be a BEAM Plus Assessor — assess your school's environmental performance with the checklist below. Evaluate and suggest how you would improve the environmental performance of your school. (For further information of BEAM Plus, please visit: ‹http://www.hkgbc.org.hk/eng/beamplus-main.aspx› or see Appendix.)
Source: Hong Kong Green Building Council, 2012

HK BEAM Plus Building Assessment Sections	Credit Requirement	Credit Value	Your Assessment
Site Aspects	Re-using previously developed site	1-4	
	Landscaping and site design strategies to contribute to the ecological value of the site	1-4	
	No negative impacts on neighbouring buildings in respect of access to daylight, views and natural breezes	1-4	
	Safe and efficient accessibility to existing public transport	1-4	
	No negative impacts to the microclimate around the surroundings due to site layout and choice of material	1-4	
	Sub-total	5-20	
Material Aspects	Re-using existing building structure or shell	1-4	
	Flexibility of building design for future expansion and use	1-4	
	At least 50% of renewable building materials	1-4	
	Choosing materials from sustainable sources	1-4	
	Using recycled materials	1-4	
	Sub-total	5-20	
Energy Use	Building structural elements that can reduce energy consumption	1-4	
	Making use of renewable energy sources	1-4	
	Using energy consumption control appliances	1-4	
	Efficiency of operation and maintenance	1-4	
	Measures to monitor energy used	1-4	
	Sub-total	5-20	
Water Use	Water quality meeting the referenced drinking water quality standards at all points of use	1-4	
	Monitoring use of water	1-4	
	Using recycled water and rain-water harvesting	1-4	
	Installation of water-efficient appliances	1-4	
	Reducing sewage volumes	1-4	
	Sub-total	5-20	
Indoor Environmental Quality	Fire safety and risk management	1-4	
	Enhancing indoor air quality and no negative impacts on outdoor air quality	1-4	
	Enhancing indoor lighting quality and reducing light pollution	1-4	
	Acoustic design and noise control	1-4	
	Barrier-free environment	1-4	
	Sub-total	5-20	
Total Credit		25-100	



Summary

1. Green buildings are built in an ecological and resource-efficient manner to achieve environmental sustainability, enhance occupants' health and productivity, and reduce impacts to the environment.
2. Statutory policy and guidelines on green buildings in Hong Kong are:
   - 'Building to Foster a Quality and Sustainable Built Environment' guidelines;
   - Building (Energy Efficiency) Regulation; and
   - Building Energy Efficiency Ordinance.
3. Two commonly used local and international voluntary green building standards are: BEAM Plus and LEED.

Key words

Green buildings
Sustainable development
Building (Energy Efficiency) Regulation
Building Energy Efficiency Ordinance
Building to Foster a Quality and Sustainable Built Environment
Building Environmental Assessment Method Plus (BEAM Plus)
Leadership in Energy and Environmental Design (LEED)

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