

World Sustainable Building Conference 2011

Hong Kong's Green Buildings Experience : Why and How

19 October 2011

Presentation by Mrs Carrie Lam Secretary for Development Government of the Hong Kong Special Administrative Region

Hong Kong : A modern and dense city of 7 million people



- Predominantly service economy (92% of GDP)
- High density development (6,480 persons/km²) with the Kwun Tong District being the most densely populated (53,110 persons/km²)
- Logistics hub with the world's 1st busiest airport for international cargo and 3rd busiest container port in 2009

Vertical Densities Meeting Hong Kong's needs



Hong Kong : great City and rural Countryside get along well together

Built up area takes up only ¹/₄ of Hong Kong's 1,100 km²

66.6% Woodland / Shrubland / Grassland / Wetland (46% are country parks and special areas under statutory control)



Preserving the countryside for public enjoyment



46% are country parks and special areas under statutory control for public enjoyment

Hong Kong Global Geopark of China











Hong Kong's Efficient Public Transport System



Fuel tax, first registration tax of vehicles and availability of parking spaces further limit car usage
Public transport accounts for 90% of average daily trips

High connectivity in urban areas

Integration of main buildings and transport nodes through network of grade-separated walkways



Hong Kong's low carbon footprint by virtue of land use efficiency and public transport

CO₂ Emissions from Fuel Combustion Per Capita in 2008



Source : "CO₂ Emissions from Fuel Combustion Highlights (2010 Edition)" by International Energy Agency

But growing carbon emission is a concern

Hong Kong 1998: 35 million tonnes GHG 2008: 42 million tonnes GHG Up 20% in ten years



Source : Council for Sustainable Development

Addressing carbon emission by targeting buildings



Source : Council for Sustainable Development

Addressing City Environment

Review Outline Zoning Plan

"The Government will review the outline zoning plans of various districts in a step-by-step manner and, where justified, revise the relevant planning parameters to lower the development density.

Such measures will inevitably lead to a reduction in public revenue, but I am convinced that it is well worth it for the better living environment that will be created for our people. "

(*The Chief Executive's 2007-08 Policy Address in October 2007*)



Mr Donald Tsang The Chief Executive of HKSAR

Land Sale

- Green planning parameters to be incorporated into the Conditions of Sale to ensure that the future development of the sites would not cause adverse environmental impacts on the surrounding areas:
 - Provision of breezeway;
 - Building Separation;
 - Maximum site coverage;
 - Provision of sufficient open space for recreational purpose;
 - Cap on GFA concession;
 - Height restriction;
 - Provision of landscape plan



Tseung Kwan O Town Lot 113 which was sold by public auction on 25 July 2011

Planning Sustainable Land Use

- Kai Tak Development
 - Developing Kai Tak into a distinguished, vibrant, attractive and people-orientated community by the Victoria Harbour
 - "Podium-free" design concept to enhance air ventilation and view corridor in the street environment
 - The landscape design of "A Green Web for Sustainable Development" to create a hierarchical landscape network
 - Landscaped deck to separate vehicles and pedestrian traffic
 - To develop a 11km continuous promenade
 - About 100-hectare open space
 - District Cooling System



Planning Sustainable Land Use (Cont'd)

- Kai Tak Development
 - Reserved alignment of a rail-based Environmentally Friendly Linkage System (EFLS) in Kai Tak Outline Zoning Plan
 - Total length about 9 km, use elevated monorail system and have 12 stations
 - Enhance connectivity to the Kowloon hinterland
 - No carbon emission along its passage, much less energy consumption than diesel buses;
 - Unique landmark in Hong Kong with high tourism appeal





Impose Air Ventilation Assessment Requirement



HONG KONG PLANNING STANDARDS AND GUIDELINES

HOUSING, PLANNING AND LANDS BUREAU TECHNICAL CIRCULAR NO. 1/06 ENVIRONMENT, TRANSPORT AND WORKS BUREAU TECHNICAL CIRCULAR NO. 1/06

Air Ventilation Assessments

Purpos

This Technical Circular sets out the euidance for apply

Compare designs 🔶 Report SVR & LVR Design SVR - site spatial average VR Evaluate, select, alter and improve design LVR - local spatial average VR height of tallest buillding Work out VR Further 2H surroundings $VR_{i} = \frac{V_{pi}}{V_{aq}}$ $VR_w = \sum F_i \times 1R_i$ studies and Model **Test points** Testing Perimeter test points Use appropriate wind profiles Overall test points and characteristics, test 16 Special test points directions

AVA Methodology

Oualitative Guidelines on Air Ventilation



Devise Urban Climatic Map and Formulate Recommendations & Standards for Wind Environment – Feasibility Study





PlanArch Consultants Ltd. 建港規劃顧問有限公司

UNIKASSEL VERSITÄT



The Draft Hong Kong Urban Climatic Analysis Map

Hong Kong Urban Climatic Analysis Map Draft Version Made in Oct. 2008 (100m resolution)

CLASS 1 Moderately Negative Thermal Load and Good Dynamic Potentials These areas are situated on the higher altitudes of mountains and steep vegetated slopes. Adiabatic cooling and trans-evaporative cooling are prevalent to bring about good dynamic potentials and moderately negative thermal load. As a result, the temperature is usually very cool. These areas are sources of cool and downhill wind. This urban climatic class includes the summits of various mountains and peaks, e.g. Victoria Peak Kowloon peaks, Tai Mo Shan, Pat Sin Leng and Lantau Peak, etc.

CLASS 2

Slightly Negative Thermal Load and Good Dynamic Potentials These areas are extensively covered by natural vegetation, greenery, and natural coastal areas including the hilly slopes. Trans-evaporative cooling is prevalent to bring about good dynamic potentials and sloutly county is prevent to thing about good synamic potentials are negative thermal load. As a result, the temperature is generally These areas are sources of cool and fresh air. This urban clima includes many country park areas, beaches and outlying island Plover Cove, Clear Water Bay, Po Toi, etc.

CLASS 3

Low Thermal Load and Good Dynamic Potentials These areas usually consist of more spaced out developm ground coverage and more open space very near the sea, the temperature is mild. This upon climatic class includes As a result coastal urban areas and many low-d fringe areas or sub-urban outskirts e. Kai Tak, Mui Wo, Shek O, Tseung Kwan O, Pak Shek Kok Science

CLASS 4

CLASS 4 Some Thermal Load and Some Dyname Potentials These areas usually consist of low to medium building volumes in a developed yet more open setting, e.g. in the sloping areasy wine fair amount of open-space between buildings. As a result, the temperature is slightly warm. This urban climatic class includes area such as mid-levels on Hong Kong Island, Upper Happy Valley, Clinese University of Hong Kong, and other hillside development prace. development areas, etc.

CLASS 5

Moderate Thermal Load and Some Dynamic Potentials 1 These areas usually consist of medium building volumes situated in low-lying area further inland from the sea or in areas fairly sitellared by natural topography As a result, the temperature is warm. This urfland, dimatic class includes many medium density developed urban areas with urban greener, e.g. Discovery Bay, Fairview Park in Yuen Long, Hong Lok Yuen in Tai Po.

CLASS 6

Moderately High Thermal Load and Low Dynamic Potentials These areas usually consist of medium to high building volur low-lying development areas with relatively less urban green arm This urb the temperature peripheral pa new towns

CLASS 7

High Ther The bootened boy printing of the second seco

CLASS

CLASS User View Consist of very high and compact building volumes with very limited open space and genreability due to shielding by buildings on many sides. Full and large grount coverage is prevalent and air paths are restricted from the nearby sea or Initis. As are result, the temperature is very hot in these areas. This urban climited class includes some highly developed core areas, e.g. Tsim Sha Tau'i, YanyMa Te', Mong Kok, Lai Chi Kok, Sheung Wan, Central, Wan Chai, Catuseway Bay, North Point, etc.

Urban Climatic Man and Sta dards for Wind Envi ent - Feasibility Stud Legend Class 1 Class 2 Class 3 Class 4 Class 5

Class 6

Class 7

Class 8

xtract Plan of Draft Urban Climatic Analysis Map with Buildings uperimposed (northshore Hong Kong and south Kowloon)



The Draft Hong Kong Wind Information Map

Hong Kong Urban Climatic Analysis Map - Wind Information Layer Summer months [Jun - Aug]



The Draft Urban Climatic Planning Recommendation Map



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Key Design / Mitigation Strategies

Objectives	Strategies	Planning Actions	Planning Time Scale	Spatial Scale
	Albedo	 Cool material & pavement; Cool roof & facade; Water retention paving; 	Immediate Building Level Intervention	City Effect
UHI Thermal	Vegetation	Planting & greeneries;Parks & open spaces;		
+ Wind	Shading	 Building design; Shelter design; Street orientation; H/W ratio; Trees; 		
Dynamic	Ventilation	 Air paths; Building ground cover & building bulks; H/W ratio; Street orientation; Open spaces; Building disposition; 	Urban & Planning Level Intervention Long term	Local Effect (neighbourhood scale)
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Addressing Buildings

Advance Green Buildings in Government Sector

- A joint technical circular by Secretary for Environment and Secretary for Development was issued on 23 April 2009 on implementing a set of targetbased assessment criteria and framework for the environmental performance of government buildings.
 - All newly-built major government buildings must attain grades not lower than the second highest level under these assessment systems.

DEVELCIEENS EURLAU TEUNICAL CIRCULAR NO. 5/2009 ENVIRONMENT BUREAU CIRCULAR MEMORANDUM NO. 2/2009					
From :	Secretary for Development Secretary for the Environment	To:	Permanent Secretaries, Heads of		
Ref. :	DEVB(W)517/94/09 ENB 7/2061/08		Departments		
Tel. No. :	2810 3961 2594 6700				
Fax No. :	2845 3489 2147 3287				
Date:	23 April 2009				

Green Government Buildings

INTRODUCTION

This circular sets out a comprehensive target-based green performance framework (the Framework) for new and existing government buildings with a view to promoting green buildings in Hong Kong.

2. This circular shall be read in conjunction with the Environment Bureau Circular Memorandum No. 1/2008 issued in June 2008, the technical circular issued by the then Environment, Transport and Works Bureau (ETWB TC(W) No. 16/2005) in December 2005 and other existing circulars relating to the planning and design of buildings. The requirements in this circular ashall prevail, if there are any differences between this circular and other existing Environment Bureau and Development Bureau circulars.

BACKGROUND

 The Government has to be a model for the community by taking the lead in driving green buildings in Hong Kong. The then

Promote Sustainable Building Design Guidelines for New Buildings

1. Building separation

For sites with area greater than 2 ha or with continuous building width of greater than 60m, an intervening space of 20% - 33.3% of total frontage area of the buildings would be required

2. Greenery

For sites larger than 1,000m², greenery equivalent to 20% – 30% of site area should be provided, including greenery at ground, podium and roof





Promote Sustainable Building Design Guidelines for New Buildings (cont'd)

- 3. Setback from narrow streets
 - On streets less than 15m wide, new buildings should be set back (from ground level to a height of 15m) to improve flow of air at pedestrian level



Provide GFA Concessions to promote green neighbourhood and green buildings

- Allow GFA concession for mandatory features like waste separation/recovery areas
- Allow GFA concession for green features beneficial to community like sky and podium garden
 - Impose 10% cap on GFA concession for other green and amenity features
- Require carparks to be "electric-vehicle (EV) charging-enabling"
- Require building to go through Hong Kong Green Building Council's BEAM-Plus assessment

Mandate Energy Efficiency in Buildings

Buildings Energy Efficiency Ordinance

- The BEE Ordinance was passed in 2010
 - To require the four major building services installations including lighting, electrical, air conditioning and lift & escalator installations of 13 categories of prescribed buildings to comply with the minimum energy efficiency standard in accordance with the Building Energy Code
 - To require commercial buildings or
 commercial portion of composite buildings to
 conduct energy audit in accordance with the
 Energy Audit Code
 - Full implementation of this Ordinance will result in energy savings in new buildings of approximately 2.8 billion kWh in the first decade (a reduction in carbon emissions of 1.96 million tones)



Mandate Energy Efficiency in Buildings (cont'd)

Update Standards and Regulations

To save electricity consumption in air-conditioning for commercial buildings and hotels, Building (Energy Efficiency) Regulation and Code of Practice for Overall Thermal Transfer Value (OTTV) in Buildings require external walls and roofs of these buildings to be designed and constructed with suitable **OTTV**



Promote Energy Efficiency in Buildings

District Cooling System (DCS)

- Air conditioning system of high energy efficiency
- A seawater DCS to be set up in Kai Tak Development
- Actively exploring feasibility of development in other sites
- Seriously considering mandating development in Kai Tak Development to use district cooling system



Promote Energy Efficiency in Buildings (cont'd)

- Earmark \$450 million to carry out minors works in government buildings to improve energy efficiency
 - Launch \$450-million Building Energy Efficiency Funding Schemes to finance private building owners to conduct energy-cum-carbon audits and carry out energy efficiency projects in their buildings



建築物能源效益資助計劃 Buildings Energy Efficiency Funding Schemes

2009年4月8日開始接受申請 Open for application from 8 April 2009



咨询 Enquiries 電話 Tel. 3757 6025
 第頁 Homepage www.building-energy-funds.gov.hk 電野 Email beefs@emsd.gov.hk

Give recognition to exemplary efforts

- Hong Kong Awards for Environmental Excellence encourage organisations to adopt green management and recognise their commitment towards environmental protection
 - Environmental Labels
 - Carbon"Less" Certificates
 - Green Innovations Awards
 - Sectoral Awards



To take our work forward further, the Council for Sustainable Development is conducting an extensive public engagement on Combating Climate Change: Energy Saving and Carbon Emission Reduction in Buildings

Combating Climate Change: Energy Saving and Carbon Emission Reduction in Buildings



Our Green Building Movement

World Sustainable Building Conference 2008 in Melbourne, Australia



Hong Kong Green Building Council

"With the support of the **Construction Industry Council, the** Hong Kong Green Building Council will soon be established. The Council will comprise representatives of the construction industry and professional sectors. It will help raise public awareness of green buildings and facilitate exchange and technological cooperation between Hong Kong and the rest of the world. We welcome the establishment of the Council, and will support its work."

(The Financial Secretary's 2009-10 Budget in February 2009)



Mr John C Tsang The Financial Secretary of HKSAR

Hong Kong Green Building Council (Cont'd)

The HKGBC was inaugurated on 20 November 2009 Vision :

To aspire for quality and sustainability at every stage of the building life cycle



Upgrade assessment tool BEAM to BEAM Plus

Hong Kong Green Building Council (Cont'd)

- The "4As" expectation for Hong Kong Green Building Council at its
 Inaugural Ceremony cum Conference on 20 November 2009
 - Advocacy

- Assessment
- Accreditation
- Award



Hong Kong Green Building Council (Cont'd)

Up to August 2011,

- HKGBC has over 140 Institutional Members and 160 Associate Members
- HKGBC has received about 85 projects to apply for BEAM Plus assessment
- HKGBC has accredited about 1,200 BEAM Professionals (BEAM Pro)
- HKGBC has accredited 30 BEAM Assessors to support the BEAM Plus assessment

The Coming Highlights

A Zero Carbon Emission Building at Kowloon Bay under construction for public education and demonstration purpose



Source : Ove Arup & Partners (HK) Ltd

Investing in research and development

Environmentally friendly construction materials

- Skyrise and vertical greening
- Concrete technology



Retrofitting of Industrial Buildings

- Allow owners to retrofit their under-utilised older industrial buildings to more gainful commercial uses at a nil payment for the change in use of the building during its lifetime
 - This would avoid pre-mature demolition of existing buildings, reduce construction waste and upgrade the existing stock older buildings to improve their performance
 - We encourage such retrofitting to receive green building certification under our locally developed
 Building Environmental Assessment Method Plus (BEAM Plus) to encourage adoption of green building design and features

Government taking the lead in retrofitting industrial buildings to green standards

- We are planning to purchase and convert an industrial building to accommodate Water Supplies
 Department New Territories
 West Regional Office
 - We will adopt green design and introduce environment-friendly and water conservation measures for the conversion works and aim for second highest rating
- The experience gained will provide practical reference for incorporating green features in retrofitting buildings





Progressive Development

"I will insist that our development be sustainable, balanced and diversified. While the economy powers ahead, we must take care of environmental protection and cultural conservation to offer our people a quality city life.

I will insist that development bring about social harmony, with different strata of people sharing the fruits."

(*The Chief Executive's 2007-08 Policy Address in October 2007*)



Mr Donald Tsang The Chief Executive of HKSAR

