Urban Greenery

Worldwide Researches on Urban Greenery and Urban Climate

- Improve air quality
- Improve thermal comfort
- Improve public health
- Reduce temperature & counteract heat island effect
- Reduce energy consumption
- Reduce glare
- Mitigate noise
- Slowdown surface water run off
- Offset carbon emission

Scientific Researches on Urban Greenery and Urban Climate – Mexico

Isotherms in Chapultepec Park, Mexico City on December 3, 1970 (5:28 to 6:48am), with clear sky and calm air.
Researches on Urban Greenery and Urban Climate - Israel

Investigation on Greenery and Air Temperature by Numerical Simulation - Singapore

The comparison of section views of scenarios with woods (a), without woods (b), and with buildings replacing woods (c) at 12:00 h.

Researches on Urban Greenery and Surface Temperature

Japan

Singapore

Strong negative correlation between surface temperature and vegetation density

Researches on Urban Greenery and Urban Climate - Brazil

Measurement Results of air temperature distribution for the park, the open square and the canyon.

Point 1 = park, point 2 = canyon and point 3 = square

Simulated air temperature for the street canyon without trees, with trees having a high-density canopy and with trees having a low-density canopy.
School of Architecture, The Chinese University of Hong Kong
Workshop on Urban Climatic for Design and Planning  
5 & 12 June 2010

Researches on Urban Greenery and Urban Climate - Israel


School of Architecture, The Chinese University of Hong Kong
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Researches on Urban Greenery and Urban Climate - Japan

Researches on Urban Greenery and Urban Climate – Hong Kong

Review of Overseas Guidelines and Good Practices on Urban Greenery Design

- Singapore
- Mainland China
- Japan
Building and Construction Authority (BCA), supported by the National Environment Agency, launched the “Green Mark Scheme for Buildings” in 2005 as an initiative to drive Singapore’s construction industry towards more environment-friendly buildings.

The rating scale comprises Green Mark Platinum, Green Mark Gold, and Green Mark award. It encourages greater use of landscaping, rooftop gardens and/or sky terraces to reduce heat island as well as energy consumption in buildings.

Researchers in Singapore are also in the process of developing a concept coined as “Green Plot Ratio” (GRP) to serve as an ecological measure for architecture and urban planning.

In addition to the design and maintenance of both on-grade and rooftop gardens, the Singapore Government promotes “sky terraces” with greenery in new developments. Roof terraces and roof gardens took root with the Urban Redevelopment Authority’s active facilitation in the late 1990s, by allowing previously unused flat roofs to be used as roof gardens.

As an incentive to encourage developers to provide sky terraces, the Urban Redevelopment Authority has exempted covered sky terrace areas from GFA computation. The overall intention is to ensure that the sky terrace would be open and visible from the surrounding, hence contributing to the overall cityscape.

To promote and educate the public on skyrise greenery, the National Parks Board (NPark) and the Centre for Total Building Performance, National University of Singapore (NUS) jointly published a guide “Handbook on Skyrise Greenery” in 2003.

The joint research reports the benefits of roof gardens to the city as whole as well as to individual property owners with respect to environmental, economic and social aspects.
Since mid-2006, the Ministry of Construction (MOC), China has formally implemented the green building design guidelines, the *Evaluation Standard for Green Building* 《绿色建筑评价标准》 to promote the practice of green/sustainable buildings.

In Mainland China, the Building Code in general stipulates the greenery at a rate *not less than 30%* for all new developments in the new districts on a mandatory basis.
In high-density cities where buildings tend to have higher site coverage for land use efficiency, green roof for podium and/or tower is commonly adopted as a design alternative.

In Tokyo, since April 2001, their Green Rooftops Initiative has set up ordinance requiring new buildings to provide at least 20% green roof. The requirement is mandatory for all sites larger than 0.1ha (and applicable for public facility sites larger than 250s.m.)

In collaboration with related agencies, Tokyo Metropolitan Government (TMG) is going to put more effort into taking the initiative for wall greenery at facilities owned by the government.

Guidelines and Good Practices on Urban Greenery Design – Japan

Review of Local Legislation and Practices

• A First Sustainable Development Strategy
• Hong Kong Planning Standards and Guidelines (HKPSG)
• Hong Kong Building Environment Assessment Method (HK – BEAM)
• Comprehensive Environmental Performance Assessment (CEPAS)
• Joint Practice Notes on Promotion of Green and Innovative Buildings (JPN)
• Practice Notes for Authorized Persons and Registered Structural Engineers (PNAP)
• Greening Master Plans
What about Hong Kong?

Potted Plant

Podium Garden

A First Sustainable Development Strategy for Hong Kong

Hong Kong Planning Standards and Guidelines - Chapter 4 Section 2 Greenery

Greening Concepts at Various Proposed Developments.
Guidelines about Urban Greenery in Hong Kong

Encourage building development to preserve or expand urban greenery to enhance the quality of living environment.

BEAM Plus
New Buildings

Version 1.1 (2010.04)

Hong Kong Building Environment Assessment Method (BEAM)

Pre-requisite is 20%

Comprehensive Environmental Performance Assessment (CEPAS) since 2005

To implement the Government’s initiative to set up a “green building” label system as a means of using market forces to promote environmentally friendly buildings, the Buildings Department commissioned a consultancy study to devise a system for assessing environmental design and performance of buildings. As a result, the Comprehensive Environmental Performance Assessment Scheme for Buildings (CEPAS) was devised.

Comprehensive Environmental Performance Assessment (CEPAS) since 2005
JPN - Joint Practice Notes on Promotion of Green and Innovative Buildings (Jointly issued by Buildings Department, Lands Department and Planning Department), since 2001

- Recognize communal sky gardens and podium gardens as “green features” that may be excluded from GFA and/or Site Coverage calculations.
Current situation on urban greenery

There is neither mandatory requirement nor effective incentive to promote greenery, despite the fact that for some development sites Landscape Master Plan (LMP) may have to be submitted to the concerned government department for approval. For each development as a whole, there is not yet any specific requirement on the percentage of greenery. There are certain controls for selected areas, e.g., under JPNI No.1, the communal sky gardens in residential buildings and communal podium gardens in commercial/industrial towers applying for the incentive should have not less than 20% of their green area be planted with greenery. However, for communal podium garden under and within the perimeter of a domestic tower, there is no requirement on the % of greenery when applying for exemption from GFA calculation under the notion of “amenity features” in accordance with PNAP 115.

More importantly, the current regulation also offers no assistance/incentive even if the current developer wants to set back building to provide more greenery along pedestrian level (although such provision is considered highly desirable by the stakeholders and more important than the greenery at the podium and/or sky garden).

Civil Engineering Development Department (CEDD) – Greening Master Plans

Before

After

Building Design that Supports Sustainable Urban Living Space in HK

Grenery

- Priority to Pedestrian Level

The benefit of greening is obvious to the public. People knock on the green wall to recognize the physical environment as a low-cost way of shelter green area. Greenery is natural after urban climate change due to advection and eddy decay and environmental quality parameters in urban, although there are different levels of greenery.

More importantly, no improvement would fail unless more provision of greening should be given to the pedestrian level, instead of the minimal such as podium, sky and roof gardens. The minimal greenery areas of high-level urban development sites will only be important for the future. All these greenery in collaborative make positive contribution to the city as a whole in terms of environmental and visually, though.
Green Roofs

Since 2001, we have included rooftop greening whenever practicable. In capital works projects like schools, hospitals, hospitals, offices, community centres, etc. and a total of 27 such projects have been completed since 2006. We have also included green roofs as rainwater projects in existing Government buildings with a further 14 projects completed since 2006.
Priority should be given to greenery especially at the pedestrian level.

In short, there are two concerned indicators with respect to greenery in the particular context of Hong Kong:

- Percentage coverage of greenery vs. the entire site area; and
- Tree planting adjoining public space at the pedestrian level.

New building developments should aim to achieve **30% site coverage of greenery** in order to contribute reasonable effect on HI mitigation. Taking into account the constraints of small site in Hong Kong, the site coverage of greenery, including green roof area, etc. should aim to achieve 20% in small sites.

Maybe we only need one tree!

Hong Kong

将来的环境是怎样的？
*What will be the environmental future of Hong Kong?*

我們的子女將生活在怎樣的將來？
*What kind of Hong Kong our sons and daughters will live?*

Thank you for listening