Fostering Building & Neighbourhood Green Development - Hong Kong Green Building Council

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Chairman, Hong Kong Green Building Council

2 November 2018

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香港綠色建築議會

Contents

- Built environment of Hong Kong
- Challenges
- The development of Hong Kong's Green Building **Rating Tool**
- **Micro-climate study**
- From green **buildings** to sustainable **neighbourhoods**
- Looking forward and world trend

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Built Environment of Hong Kong

7.3 M population

Built-up areas take up 24% of land

Population density of built-up areas

27,330 person/km^2

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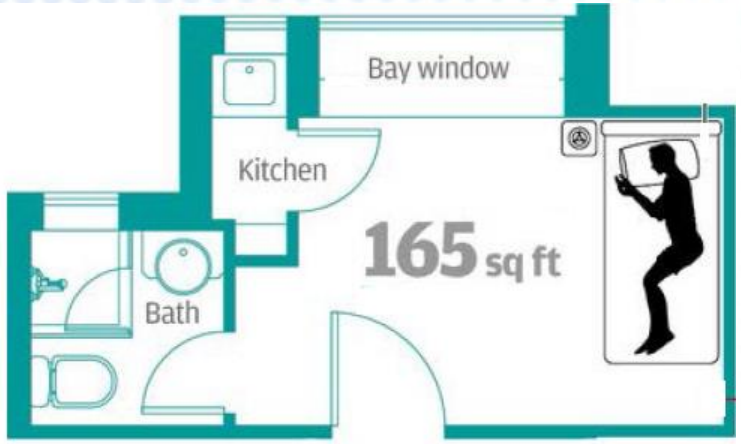
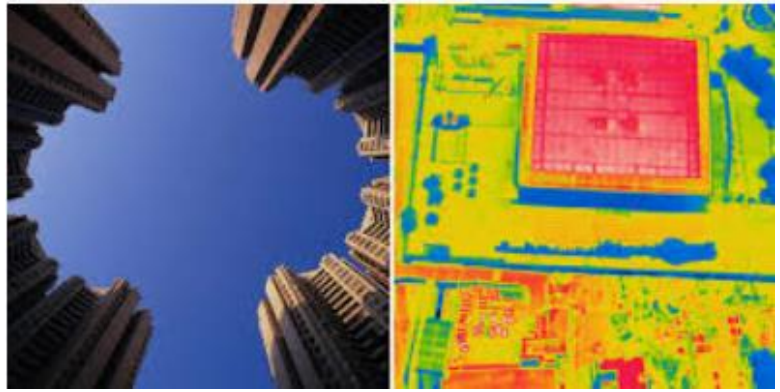


nano flat



Creating a liveable city comes with a lot of challenges:

- Shortage of **land**, tiny living spaces
- Noise from high-density environment
- Urban **heat island** effect
- **Air ventilation** problems
- Health and wellbeing
  e.g. SARS epidemic in 2013
- Lack of landfills for municipal **waste**

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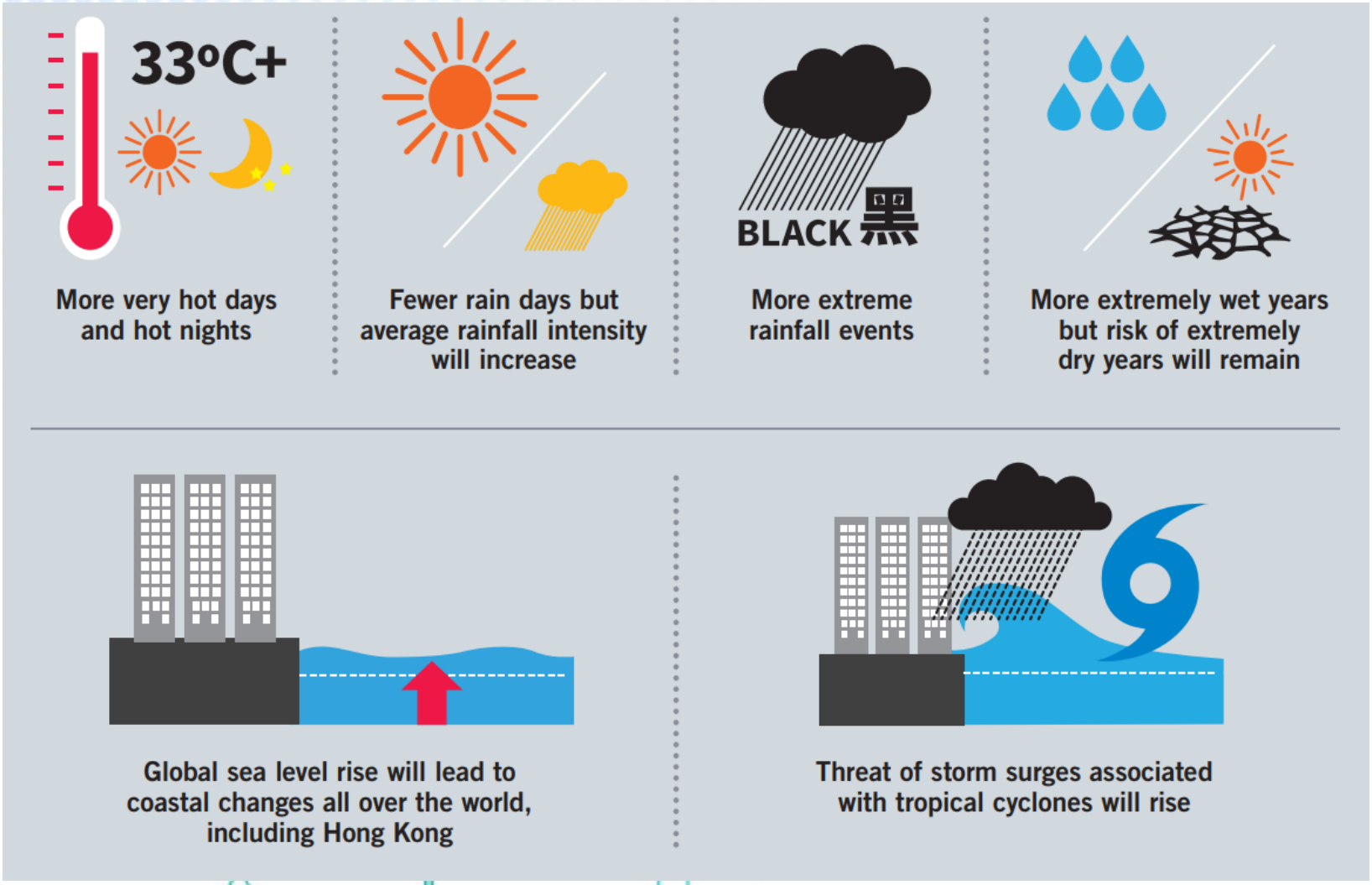
Climate Change



- Climate change and **extreme** weather
- As mentioned in “Hong Kong Climate Change Report 2015”, Hong Kong will experience increasingly extreme weather events.
- Adaptation of urban and building designs

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Driving the GREEN Building Movement !

Inaugural in ***2009***

Vision

To help save the planet and improve the wellbeing of the people of Hong Kong by transforming the city into a greener built environment.

Mission

To lead market transformation by advocating green policies to the Government, introducing green building practices to all stakeholders, setting standards for the building profession, and promoting a green lifestyle to the people of Hong Kong.

A Network of Strong Support

4 Founding Members

CONSTRUCTION INDUSTRY COUNCIL 建造業議會

BEAM

BUSINESS ENVIRONMENT COUNCIL 商界環保協會

HKGBC 環保建築專業議會

Over 150 Institutional Members

Over 1,800 Associate Members

華懋集團 Chinachem Group
SWIRE PROPERTIES
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華潤電力 CR Power
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恒隆地產 Hang Lung Properties
恒基兆業地產集團 Henderson Land Group
置地公司 Hongkong Land
鴻基創業有限公司 Hung Key Cheong Yip Limited
Hysan 希慎
Kerry Properties 嘉里建設
L&O Architects
領展 Link
MTR
南豐集團 Nan Fung Group
新世界發展有限公司 New World Development Company Limited
Paul Y. 保華建業 Paul Y. Engineering
Schneider Electric 施耐德電氣
SIEMENS
信和集團 Sino Group
新鴻基地產 Sun Hung Kai Properties
煤氣 Towngas
JEC 怡和機器 Jardine Engineering Corporation
vanke 万科
有利集團有限公司 Yau Lee Holdings Limited

(Information as of Oct 2018)

Numerous Supporting Organisations

香港建築師學會 The Hong Kong Institute of Architects
HKIE The Hong Kong Institution of Engineers 香港工程師學會
The Hong Kong Institute of Surveyors 香港測量師學會
香港規劃師學會 Hong Kong Institute of Planners
HKILA The Hong Kong Institute of Landscape Architects

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Developing a green building rating tool to meet the challenges

1996
HK-BEAM
for office buildings

2004
BEAM 4/04 & 5/04 for
all types of buildings

2010
Launch of **BEAM Plus**
New & Existing
Buildings V1.1,
after establishment of
HKGBC

2012
New Buildings V1.2,
with **new passive design criteria**

2013
Interiors V1.0

2016
Existing Buildings V2.0,
Neighbourhood V1.0

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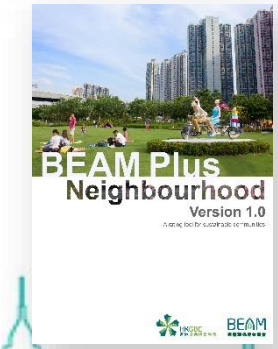
The BEAM Plus Family

Masterplanning

Neighbourhood V1.0
(ND)

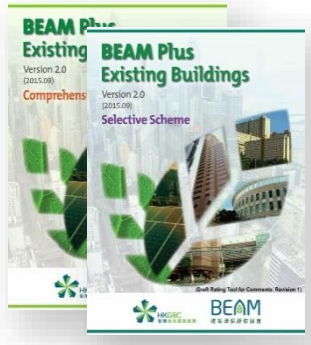


Building Design & Construction

New Buildings V1.2
(NB)

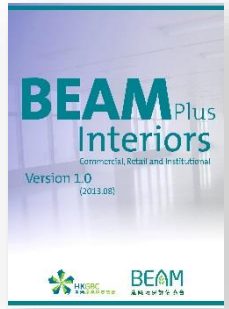
Operation & Maintenance

Existing Buildings
V2.0
(EB)



Fit-out

Interiors V1.0
(BI)



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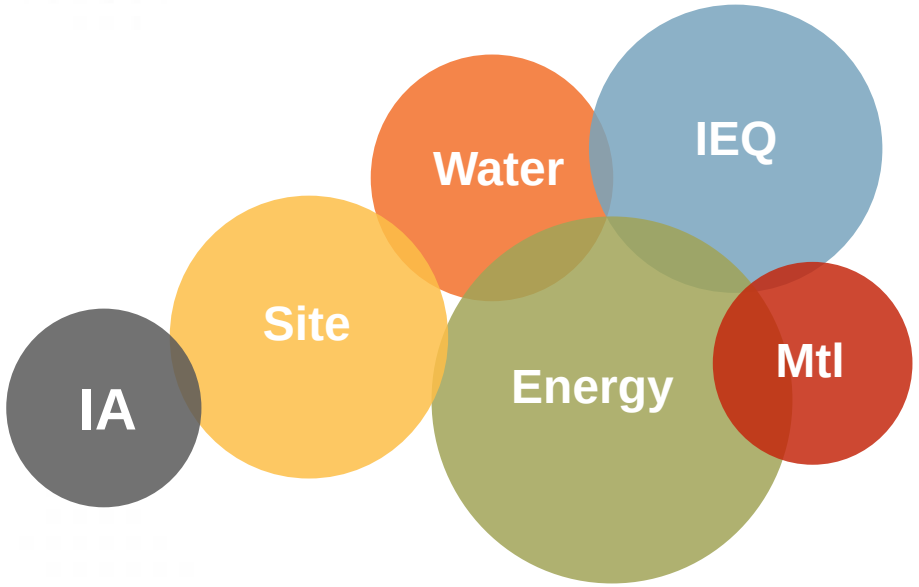
Six major aspects



Site : land use, outdoor pollution management, etc.

Materials : material use, waste management, etc.

Energy : energy efficiency, passive design, provisions for energy management, etc.

Water : water quality, water efficiency, water recycling, etc.

Indoor Environmental Quality : IAQ, thermal, lighting, acoustics, barrier free access, etc.

IA: innovations, additional performance

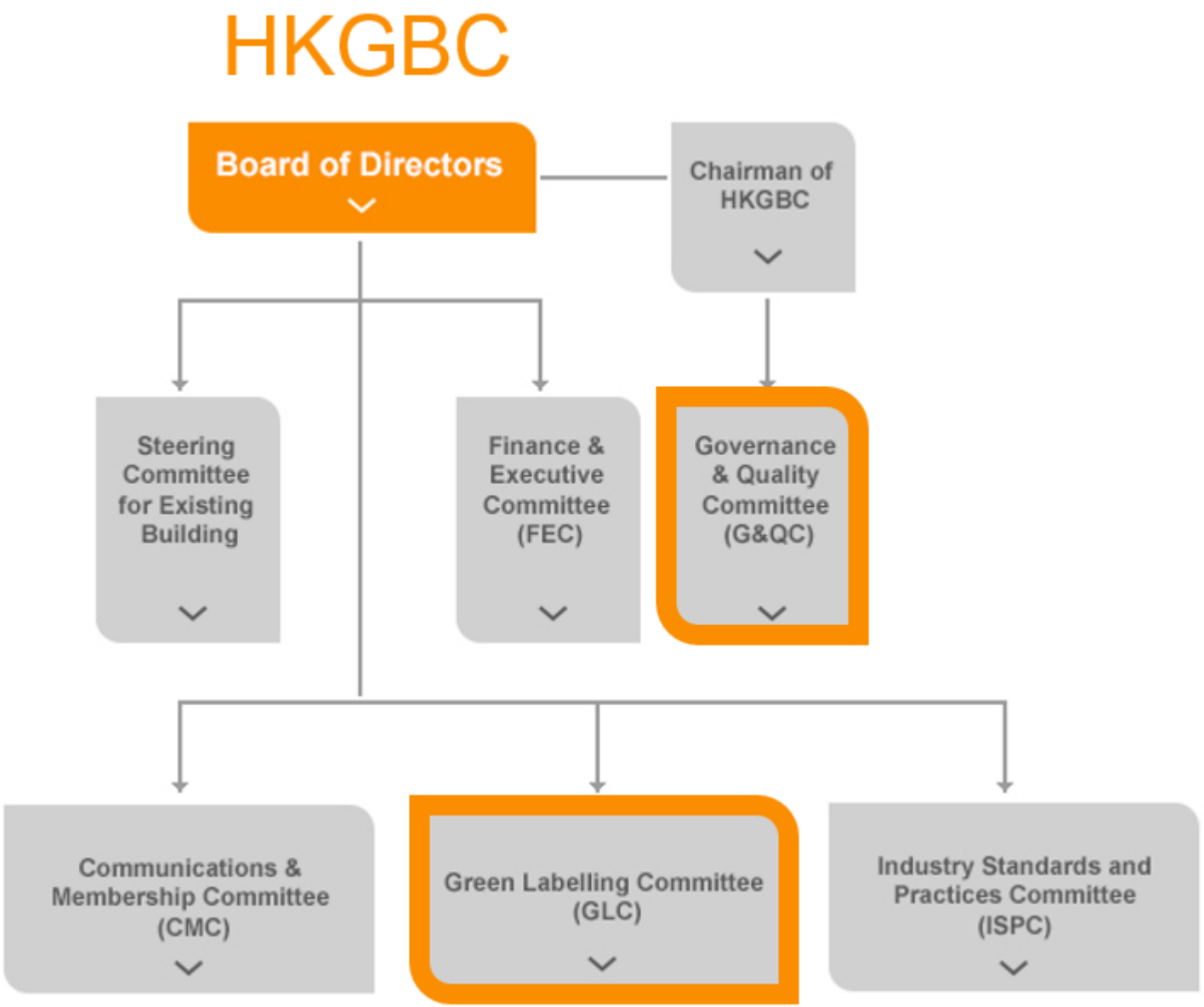
HKGBC BEAM Plus 綠建環評

Example Grading Method (for New Buildings)

	Overall	Site	Energy	IEQ	Innovations & Additions (credits)
Platinum	75%	70%	70%	70%	3
Gold	65%	60%	60%	60%	2
Silver	55%	50%	50%	50%	1
Bronze	40%	40%	40%	40%	-

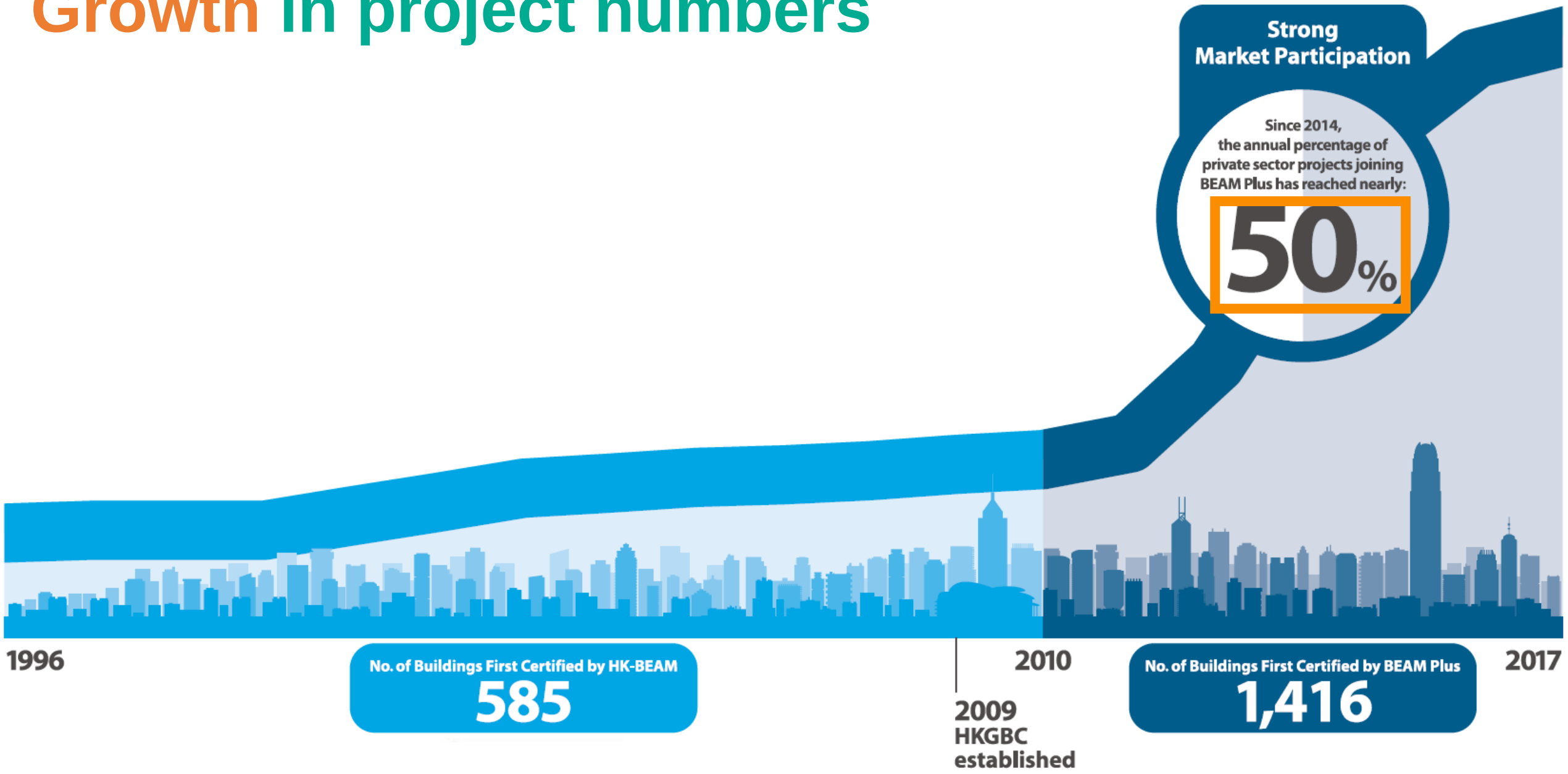
HKGBC BEAM Plus 綠建環評會

Robust Governance



HKGBC	BEAM Society
Setting the policy	Technical assessment
Final Appeal	First Appeal
Audit to BEAM Society	

Growth in project numbers



Greenville Villa (綠悠雅苑)

A Housing Society project achieving NB Platinum

- People-oriented design
- Greenery ratio at 41%
- Natural ventilation in flats and lobbies
- Recycling bins on each floor
- Low-VOC materials indoor
- EV charging facilities in car parks

  (less air pollution by using electric cars)

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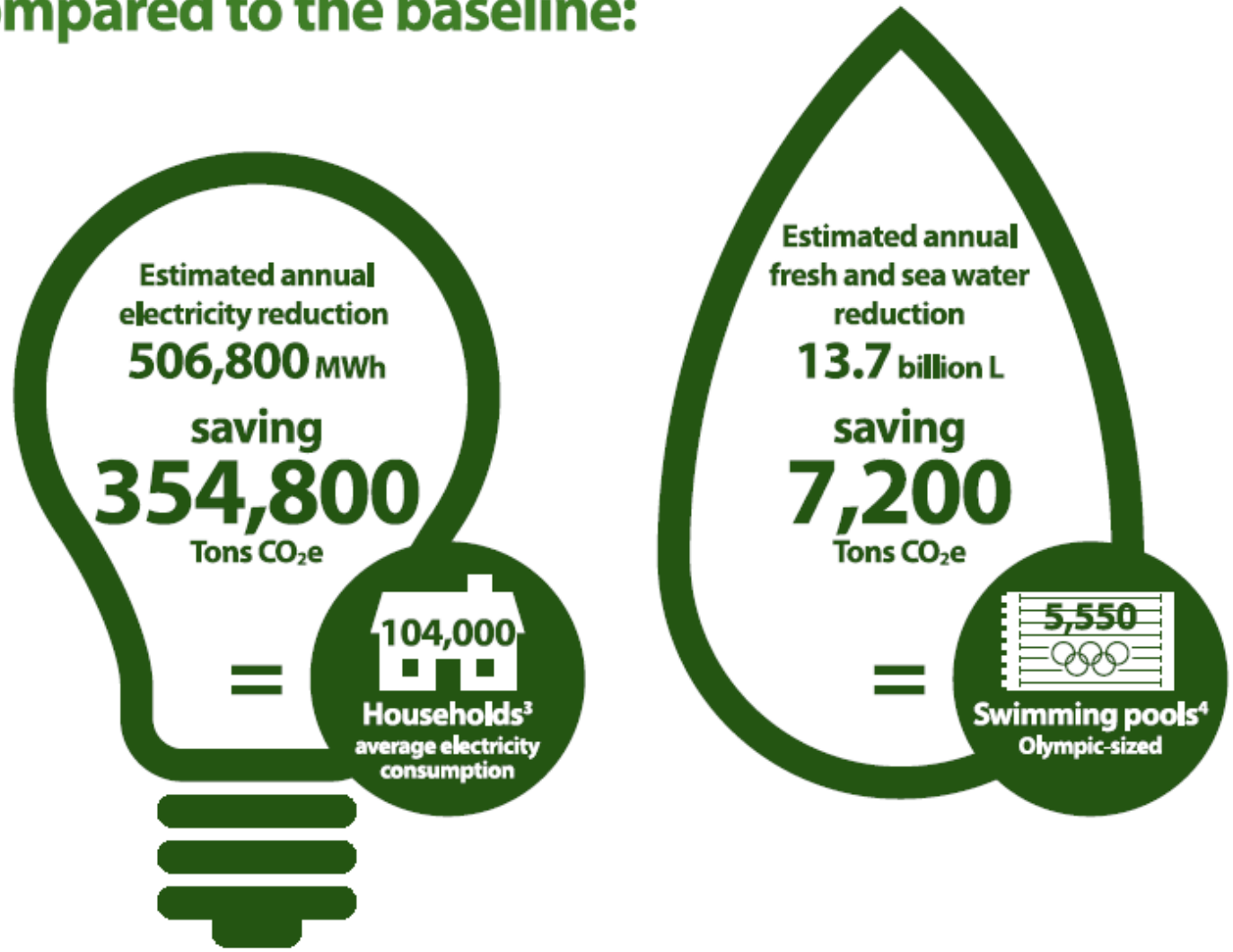
Total saving of BEAM Plus assessed projects compared to the baseline:



Total estimated carbon emissions saved each year:

362,200

Tons of CO_2e

= 15.7 million trees planted

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BEAM Plus achievements 2010-2017

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Problems in Hong Kong – **Wall Effect**

- Wall effect caused by high-rise buildings along the coast, blocking the ventilation pathways across the urban area.
- Isolated high rise buildings can improve ventilation of surrounding area
- Districts with uniform building height are worse ventilated then those with variable heights

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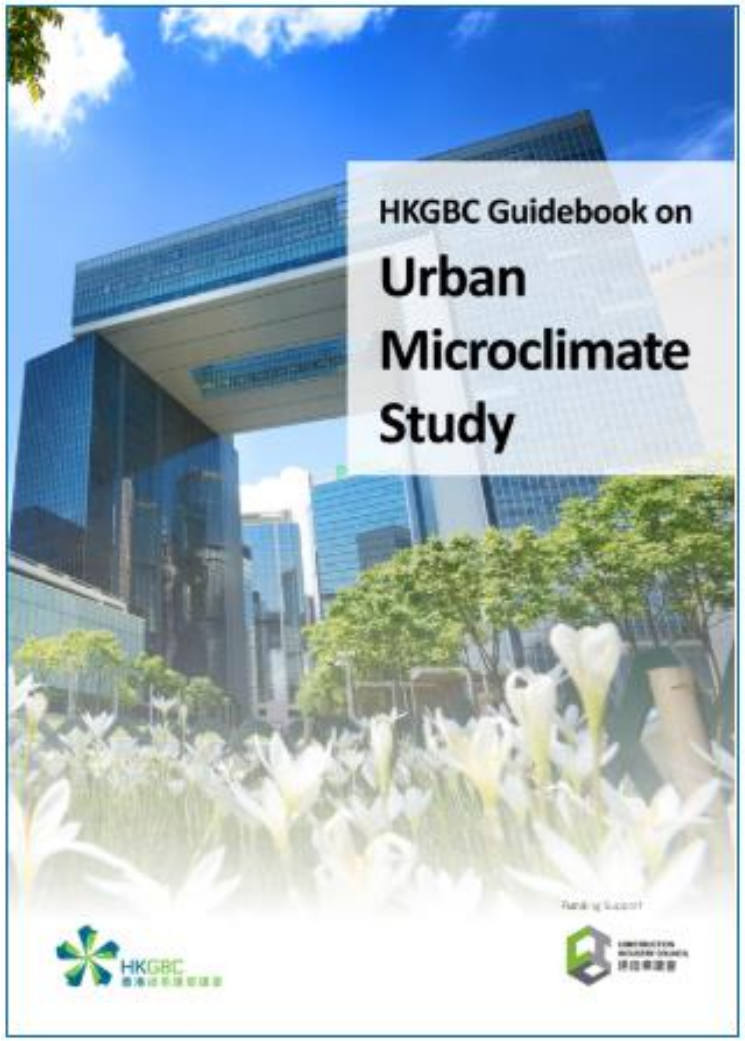
Urban Microclimate Study 2016



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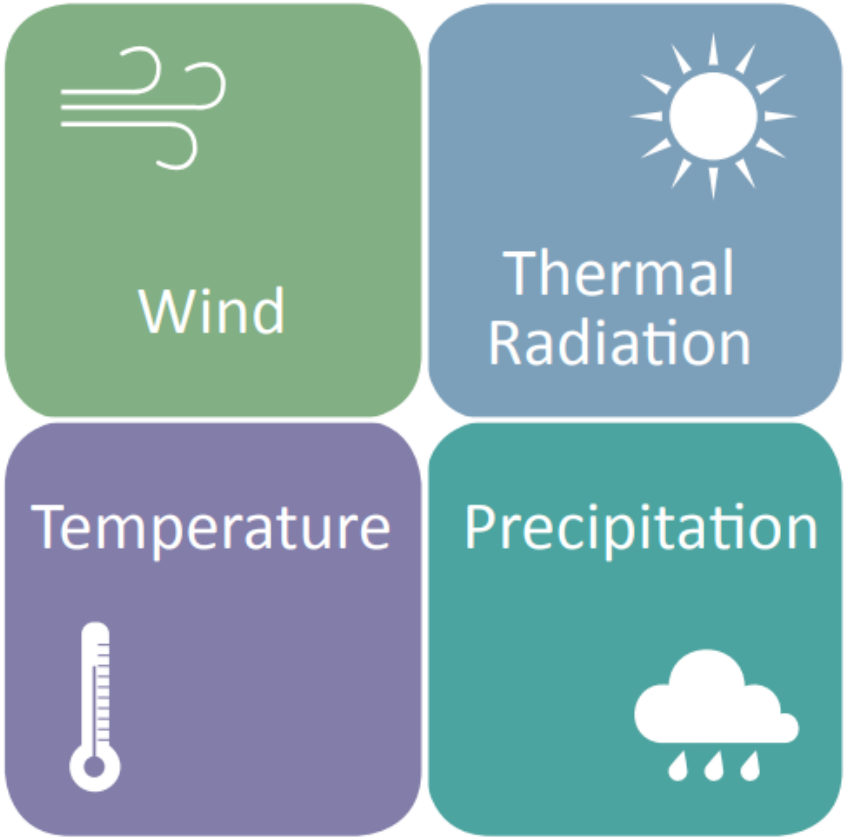
Urban Microclimate Design Guidelines

- Increase ventilation through:
  - site planning
  - building design
- Increase evaporative cooling
- Reduce heat accumulation
- Reduce heat release
- Reduce direct solar radiation
- Reduce surface temperature
- Provide rain protection



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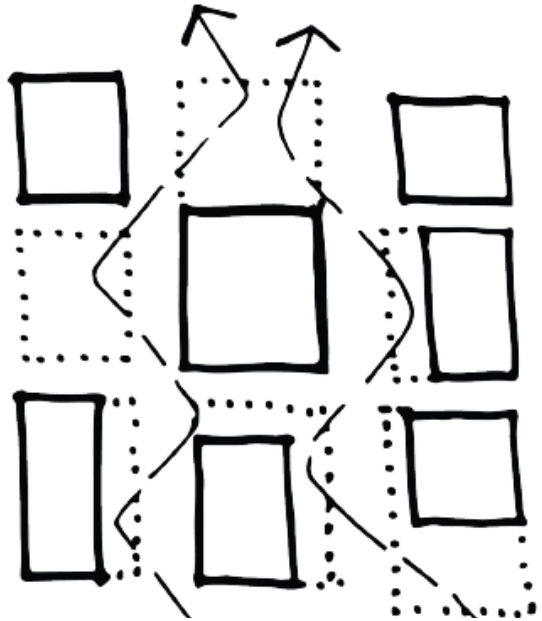
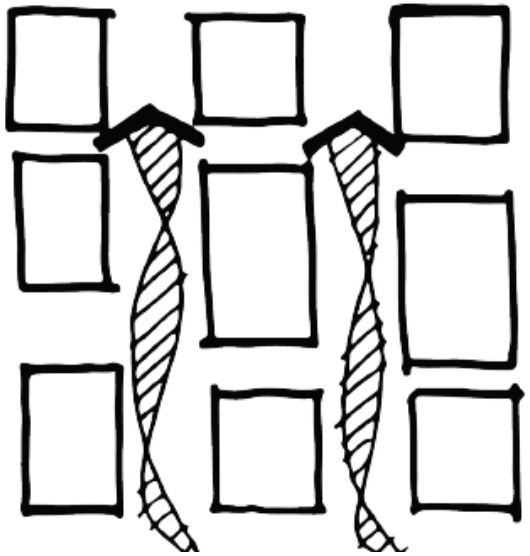
(1) Ventilation

Increase ventilation with site planning



Connect Open Spaces



Arrange buildings to channel wind

Kai Ching Estate

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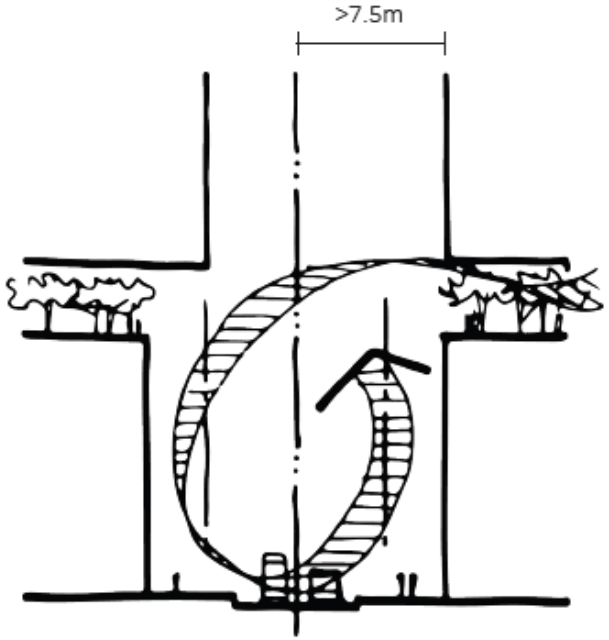
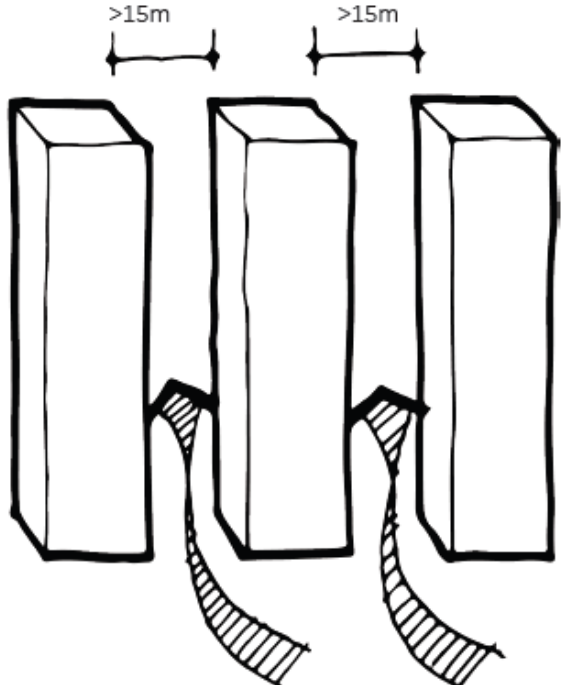
(1) Ventilation

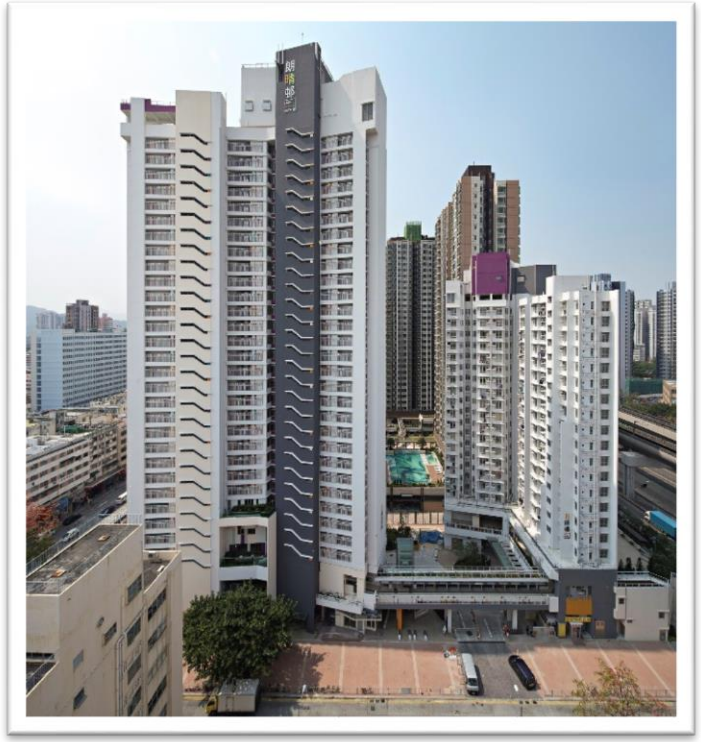
Increase ventilation with site planning



Building Set Back



Increase permeability of building blocks



Long Ching Estate

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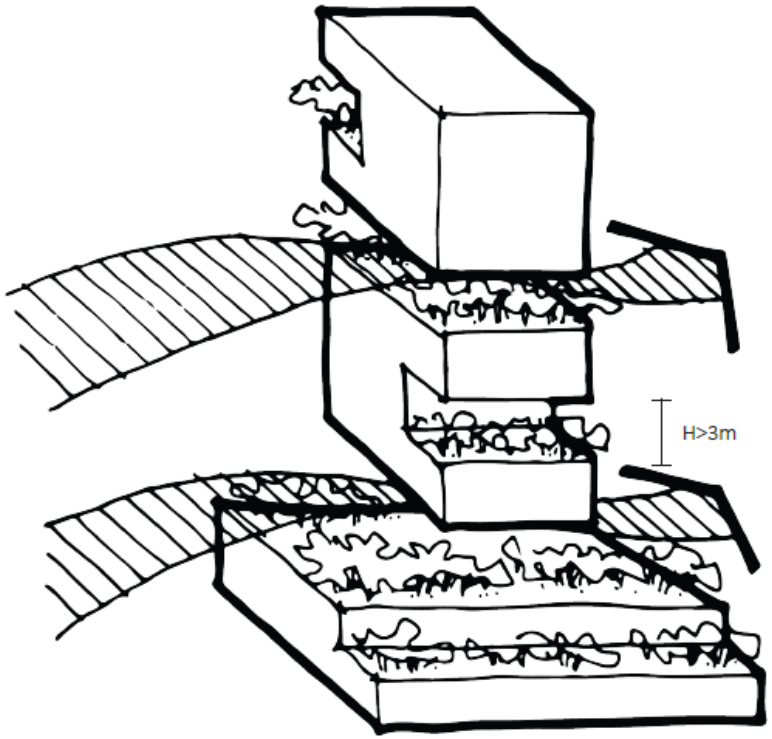
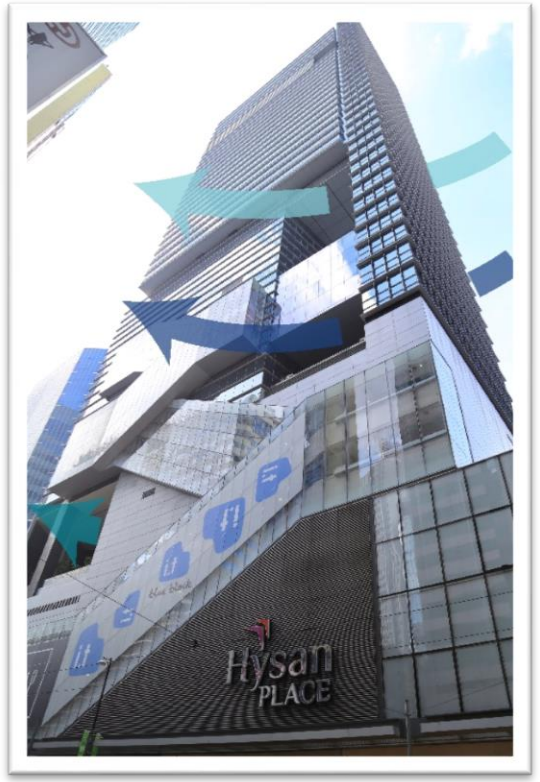
(1) Ventilation

Increase ventilation with building design



Permeable sky garden



Hysan Place

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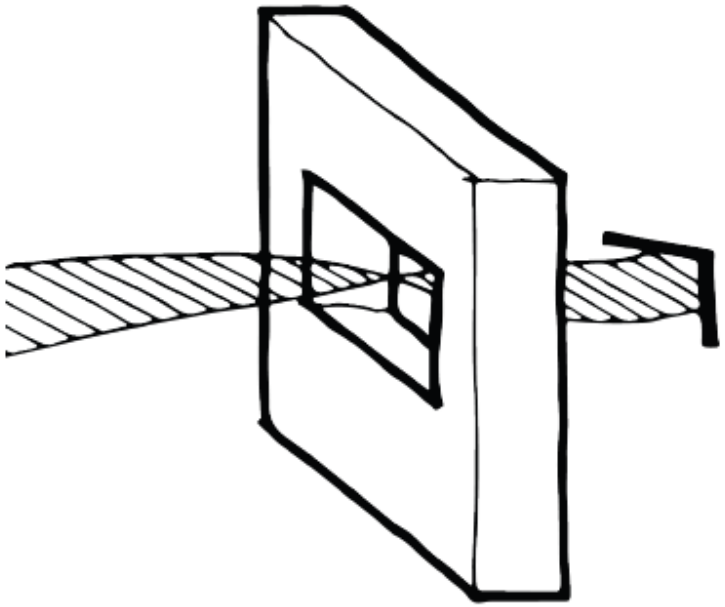
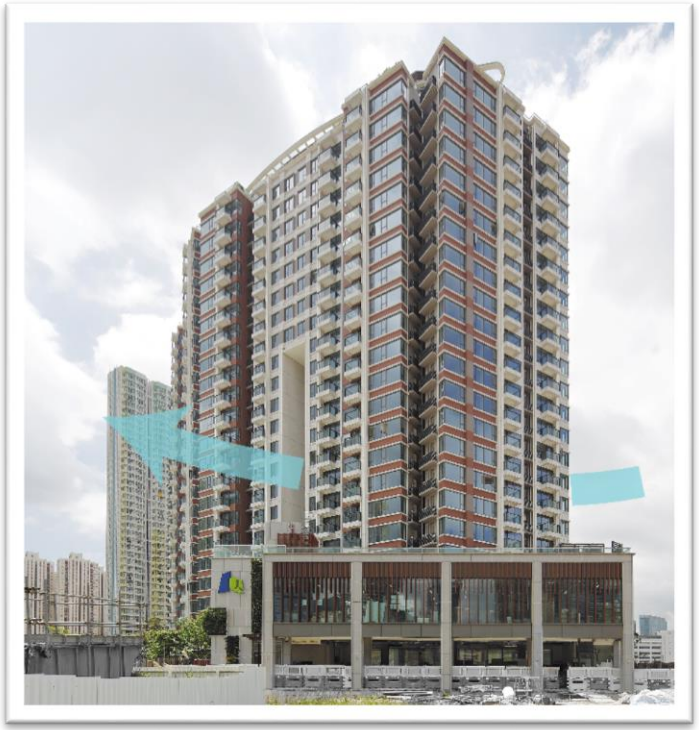
(1) Ventilation

Increase ventilation with building design



to Increase building permeability

- Create openings in building façades



URA's Kai Tak Development

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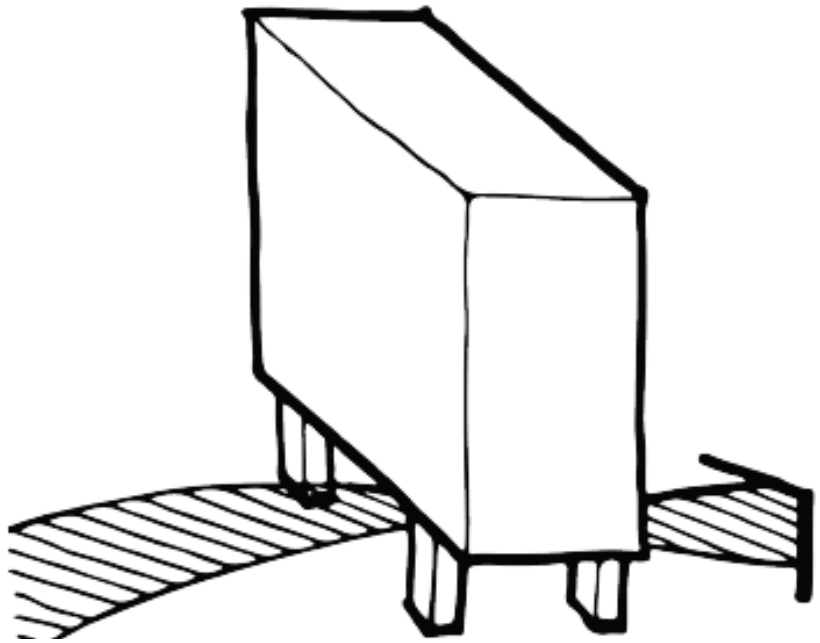
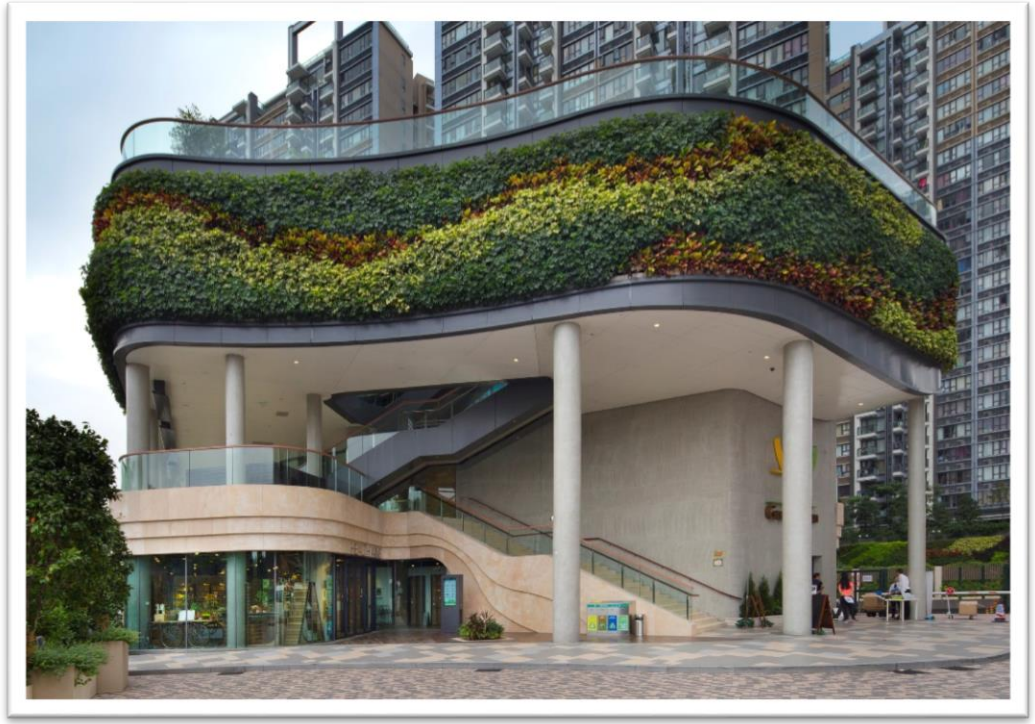
(1) Ventilation

Increase ventilation with building design



Increase ground zone air volume



Green Atrium

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(2) Public Health and Comfort


1.


2.


3.

Outdoor **open space**

1. Reduce **heat discharge** near pedestrian area
2. Provide **shading** for pedestrian activities
3. Provide **water features** & **greenery** to increase evaporative cooling

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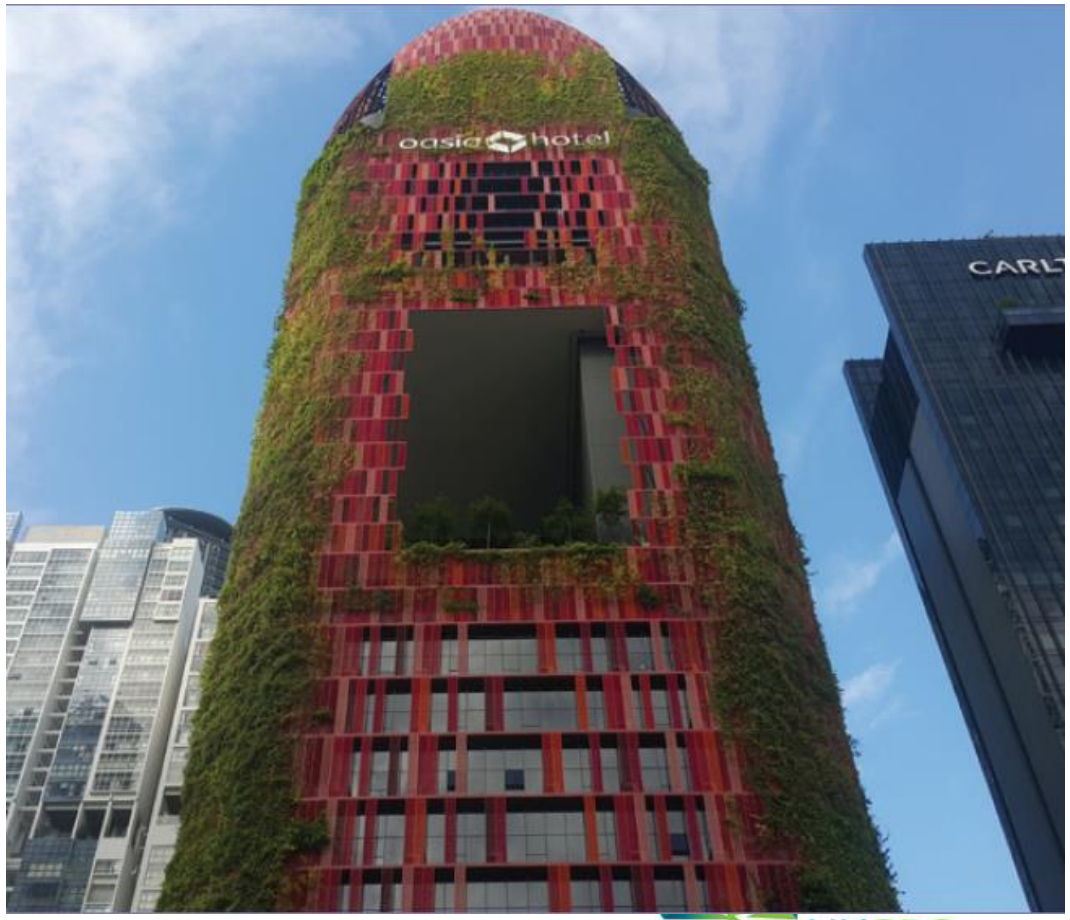
(2) Public Health and Comfort

Existing Building

Reduce Temperature by **Increase albedo**

Reduce Temperature by

Reduce thermal mass



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(3) Radiation

Reduce direct solar radiation
Reduce surface temperature

Shading provided by covered walkway, tree canopies and building blocks

Cool materials for ground surface and **green wall**

Increase albedo and sky view factor

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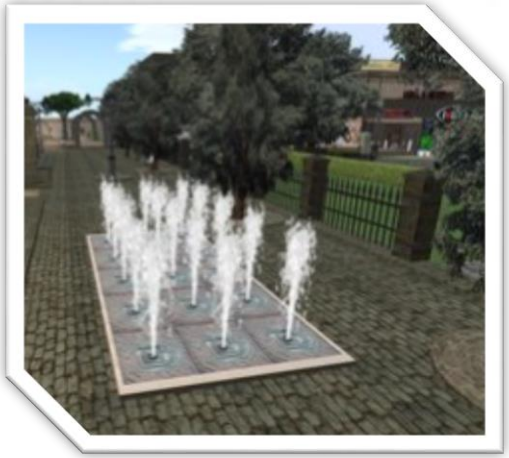
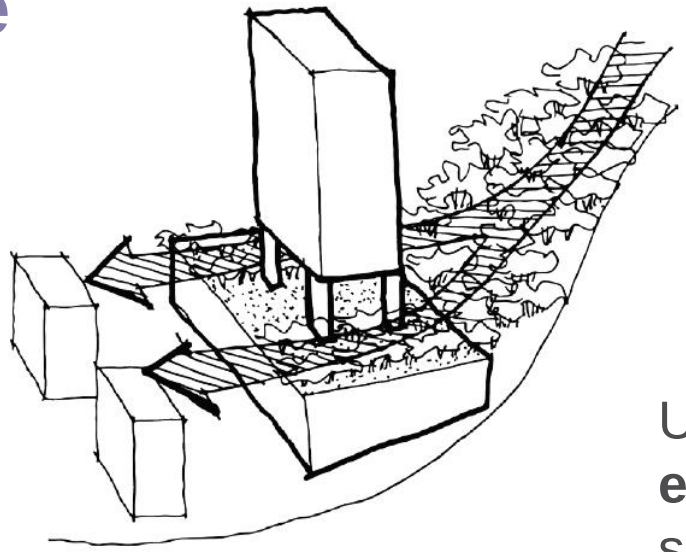
(4) Heat

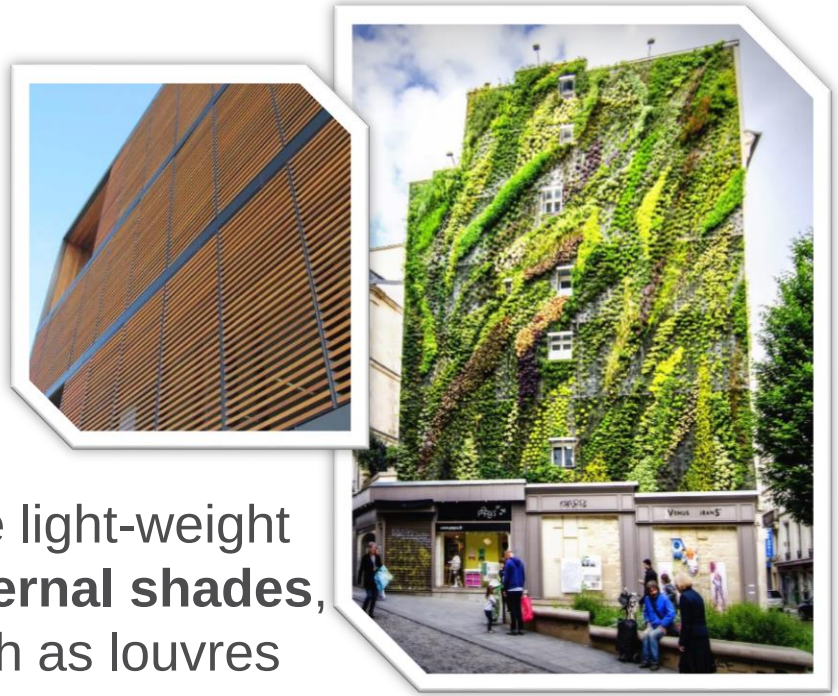
Increase evaporative cooling
Reduce heat accumulation
Reduce heat release



Water features, **greenery** and **permeable paving**



Increase **ventilation** to carry away heat



Use light-weight **external shades**, such as louvres or green walls

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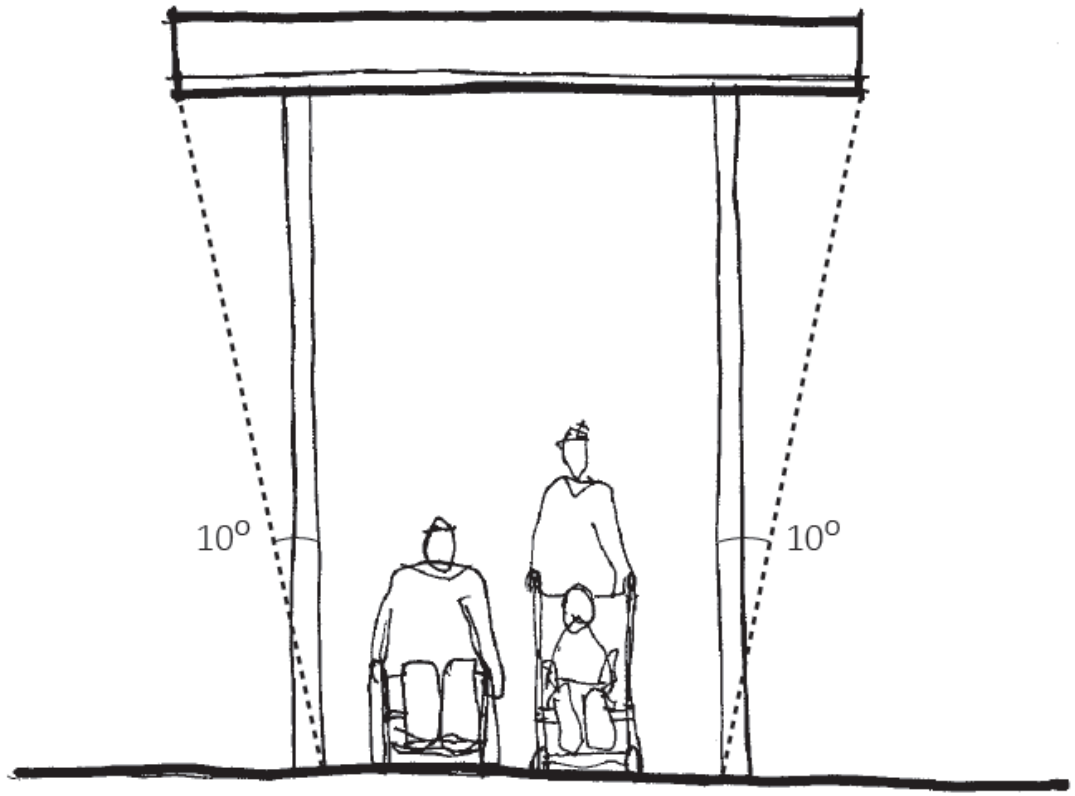
(5) Precipitation

Provide rain protection



- Protecting pedestrians from precipitation will **improve the microclimate and usability** of open spaces.
- In designing a covered walkway, the angle of deflection from the driving rain effect should be considered.

In designing a covered walkway, the angle of deflection from the

BEAM Plus Neighbourhood

- Spaces between buildings
- Developments to be good neighbours
- Embraces socio-economic elements
- Sustainable lifestyle
- Diversity of housing types and mixed-use developments
- Synergy through shared use of facilities in a neighbourhood scale
- Enhanced indoor and outdoor Environmental qualities
- Waste recycling to mitigate landfill shortage problem

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BEAM 建築環保評估協會
HKGBC Funding Support:
CONSTRUCTION INDUSTRY COUNCIL 建造業議會

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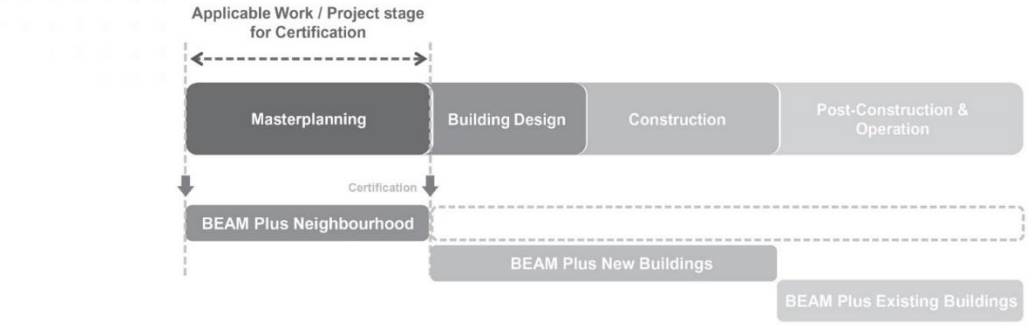
Neighbourhood:
A fundamental block of a city
Evaluate at an early stage



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Emphasize on Spaces between Buildings

Public realm matters

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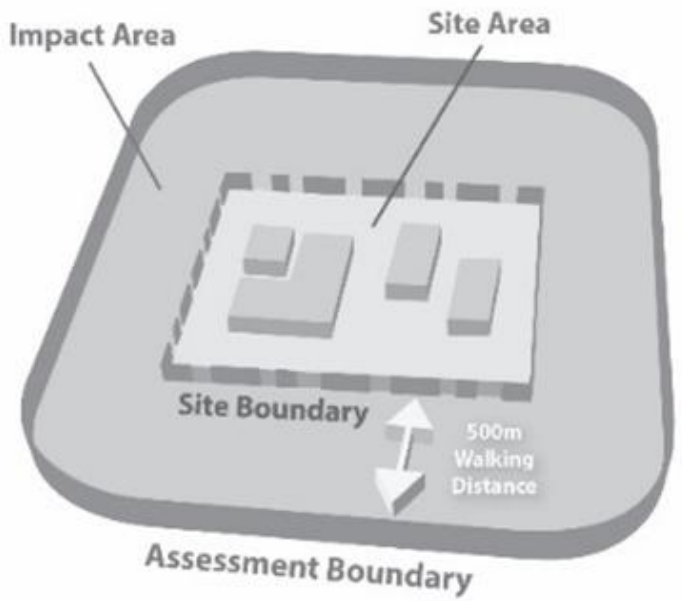
Concept of “Being a good neighbour”

Bring positive impacts to occupants & immediate neighbours



Assessment Area
= Site Area + Impact Area

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Incorporating New Assessment Aspects

Community Aspects (CA)

New!

Site Aspects (SA)

Materials And Waste Aspects (MWA)

Energy Aspects (EA)

Water Aspects (WA)

Outdoor Environmental Quality (OEQ)

New!

Innovations and Additions (IA)

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COMMUNITY ASPECTS

Community engagement

Community farming

Local economy

Cultural assets

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COMMUNITY ASPECTS: PLACE - MAKING

Place-making

- New interest/experience
- Social interactions
- Relationship
- Feelings and memories
- Sense of place

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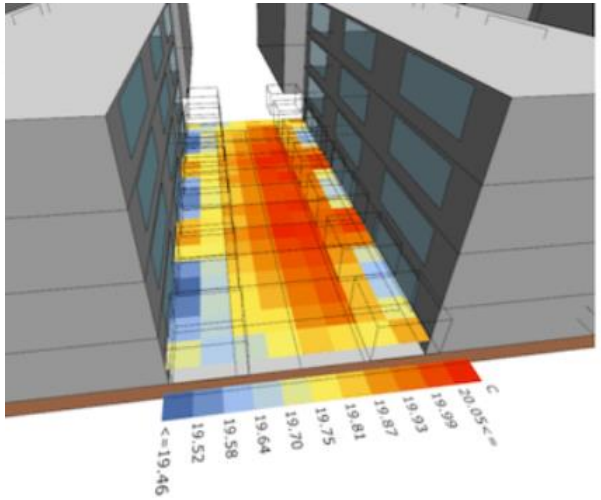
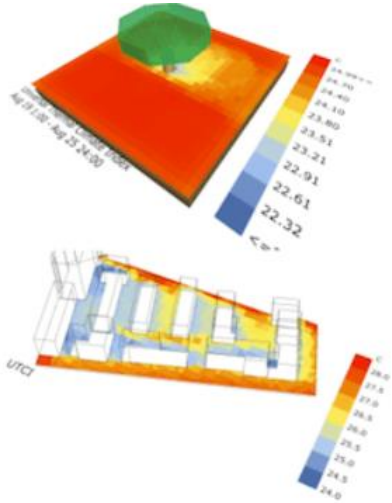
OUTDOOR ENVIRONMENTAL QUALITY





Thermal comfort, urban heat island

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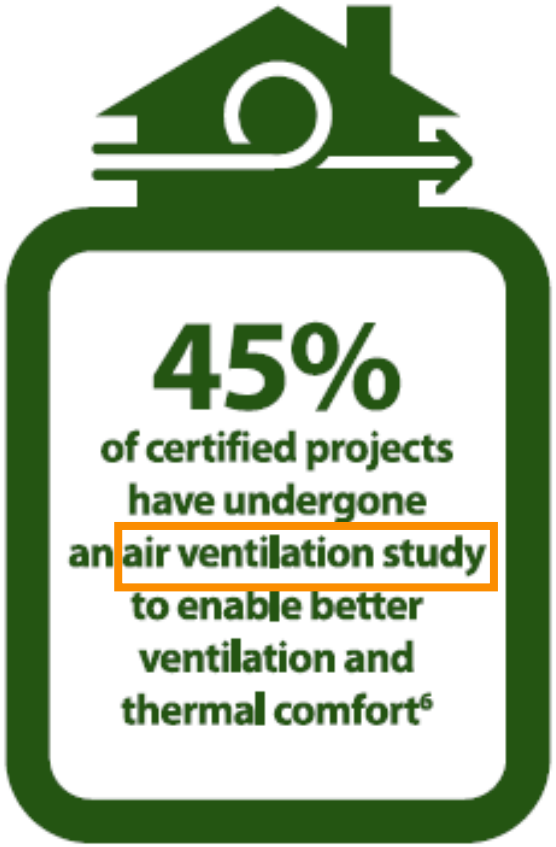
BEAM Plus achievements 2010-2017

Pleasant Environment



Walkability and Mobility

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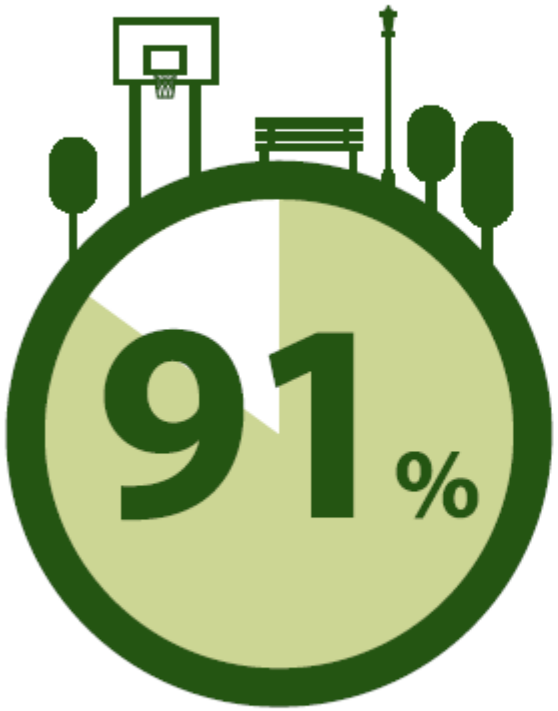
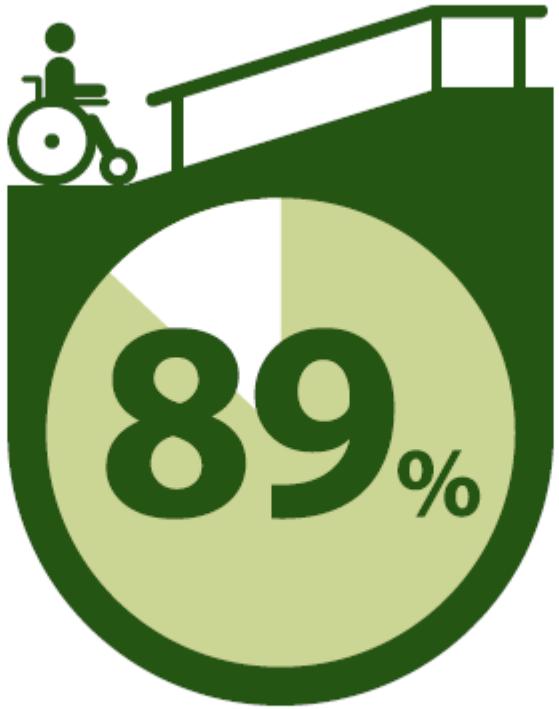
BEAM Plus achievements 2010-2017

Community Facilities and Amenities



of certified projects have
nearby recreational facilities

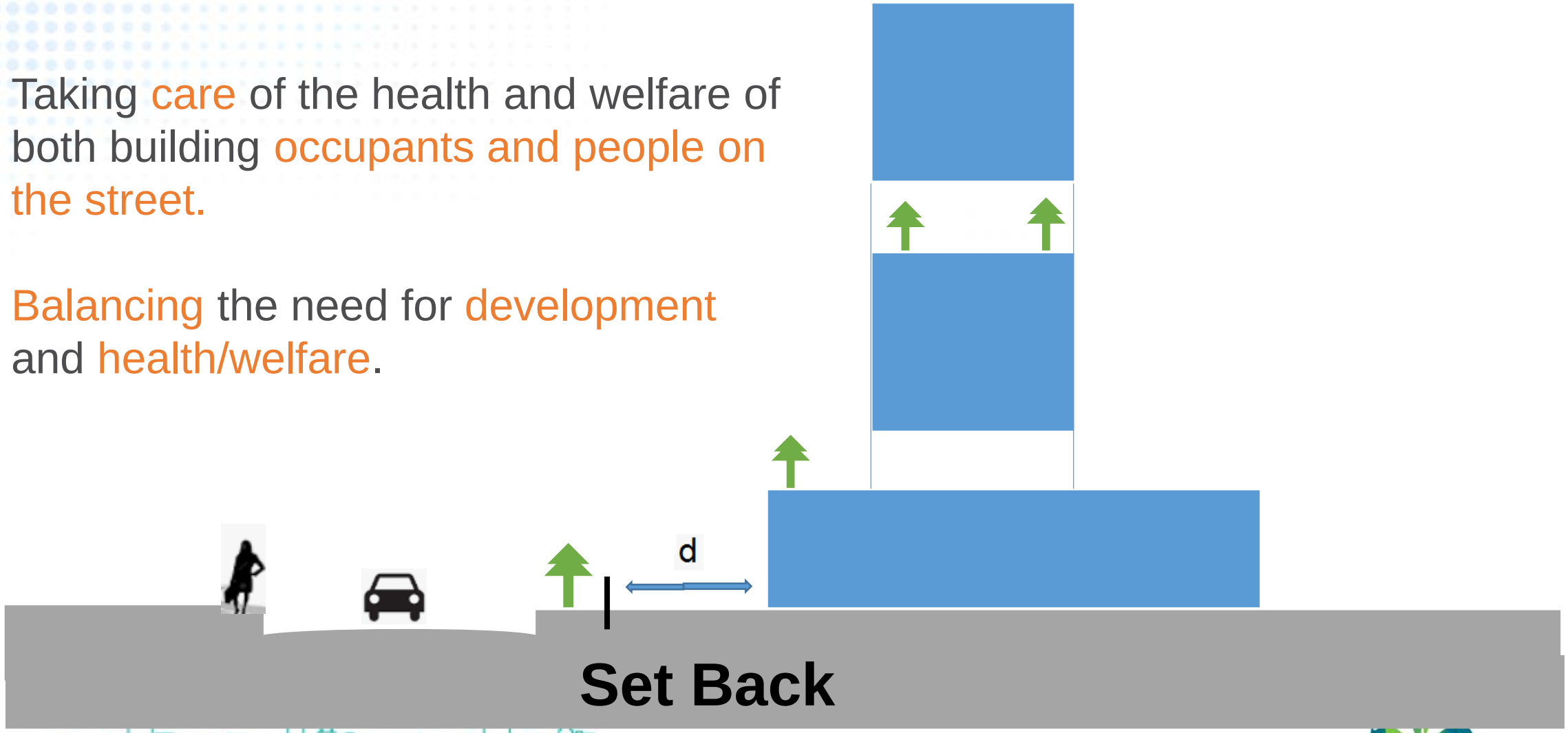


of certified projects provide
enhanced universal access

of certified projects are
well-equipped with
building amenity features

Micro Climate and Neighbourhood Design

- Taking care of the health and welfare of both building occupants and people on the street.
- Balancing the need for development and health/welfare.



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Neighbourhood Design (BEAM Plus)

Microclimate Study

Hong Kong's contribution to :

1) Hot and humid climate regions in South East Asia

2) High rise & high density cities

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Neighbourhood & Microclimate Study

Communal usage of precious natural resource - **AIR**

Communal usage of

1) Open spaces
2) Recreational areas, school playgrounds
3) Harbour promenades, covered walkways, etc.

Communal usage of
LAND RESOURCES

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Looking forward

In the coming years, HKGBC will –

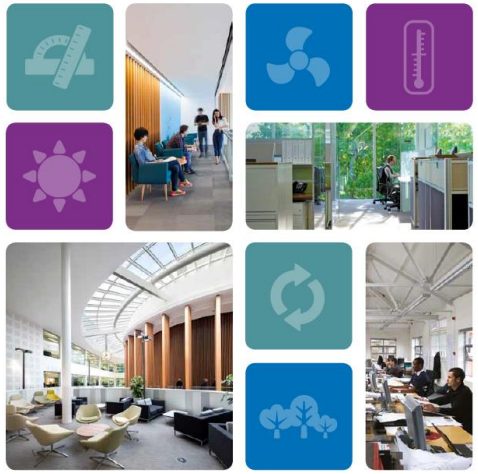
- further develop the **Eco-labelling Schemes** for building products and materials by unifying two local schemes

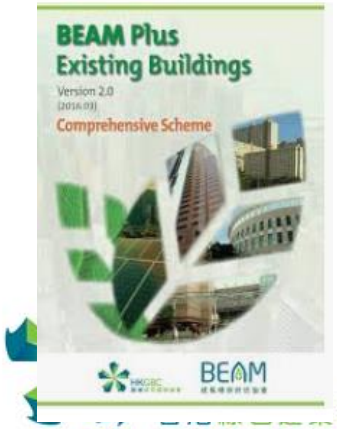
- conduct **health and wellbeing studies** in buildings

- roll out **Version 2.0 of BEAM Plus NB** that will emphasize more on health and wellbeing

- promote **BEAM Plus EB** to more existing buildings e.g. NGO buildings, aged housing estates, etc.

- help in developing a sustainability design assessment tool for **built environment & infrastructure** to help build a sustainable city





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Thank you !

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