



Green Buildings for Everyone, Everywhere : Dreams and Miracles

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Former Deputy Director of Housing

PLEA 2018 “Smart and Healthy within the 2 Degrees”

(i) Science and Technology, (ii) People and Community, (iii) Design and Practice and (iv) Education and Training.

Yasumoto International Academic Park, CUHK, Hong Kong. 10 – 12 December 2018



Green buildings preserve precious natural resources and improve our quality of life.

Good passive design is critical to achieving a lifetime of thermal comfort, low energy bills and low greenhouse gas emissions.

What is green building?

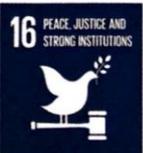
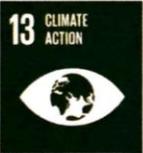
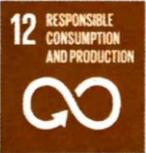
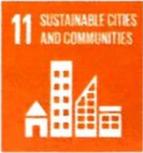
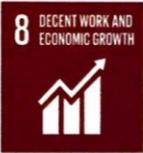
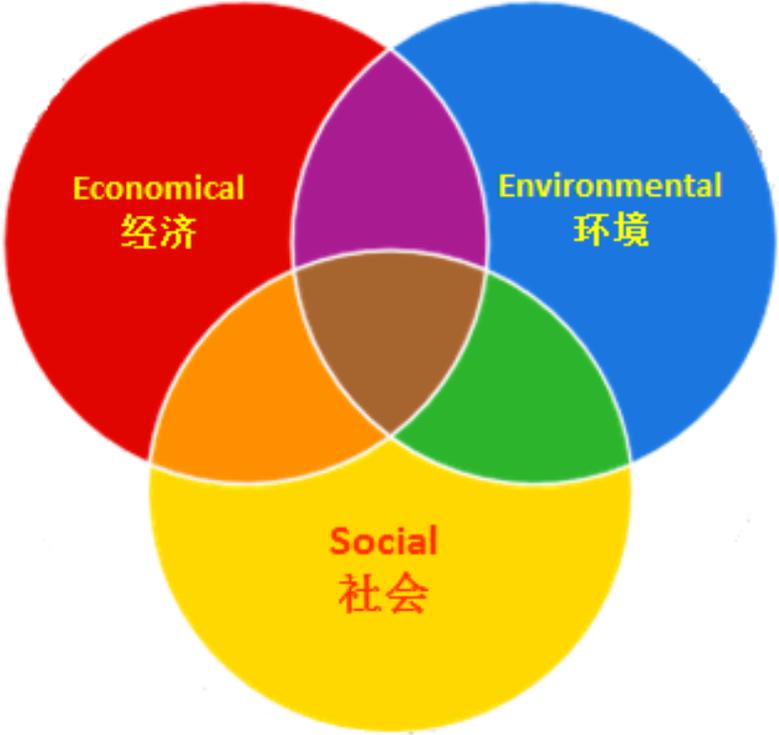
A 'green' building is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment.

Green buildings preserve precious natural resources and improve our quality of life.

There are a number of features which can make a building 'green'. These include:

- Take an intelligent approach to **energy**;
- Safeguarding **water** resources;
- Minimizing **waste** and maximizing reuse;
- Promoting **health and well-being**;
- Keeping our environment **green**;
- Creating **resilient and flexible** structures;
- Connecting **communities and people**;
- Considering **all stages** of a building's life-cycle

Sustainability



Let's Build a Collaborative Future for Sustainability.

What do we mean by designing for sustainability?

How to drive design for sustainability?

Outline of presentation

1. Green Building Movement in the World : Green Buildings for Everyone, Everywhere
2. Green Building Movement in Hong Kong
3. Planting Dreams and Growing Miracles : Planning & Design for Sustainability of Quality Public Housing by Hong Kong Housing Authority
4. Moving Forward

1. Green Building Movement in the World



Green Buildings for Everyone, Everywhere
“The World Needs More Green Building!”

We have only one Earth!

39%

of global energy-related emissions*

28% operating* 

 11% building and construction

82% of final energy consumption
in buildings was supplied by fossil
fuels in 2015.*

What is the World Green Building Council

Global member network of Green Building Councils enabling green building and sustainable communities through leadership and market transformation



1. **Membership:** Approval and advancement of Member Green Building Councils
2. **Regional Networks:** in Asia Pacific, Africa, Europe, MENA, Americas
3. **Global Projects and Partnerships**
4. **Marketing, Communications and Events**
5. **Operations, Fundraising and Governance**

Our Projects

Advancing Net Zero



Healthy Buildings



Green Mortgages



Green Cities



Renovation Strategies





FINDINGS

Member survey 2018

Findings based on GBC data from Sept 2017 to Sept 2018

Findings

- Trends GBCs have identified as having an impact on our industry are **climate change, energy transition and energy efficiency**
- This has led to **a focus on existing building** – retrofits as well as performance in operation
- GBCs pointed to an increase in the supply of green products and **a focus on the circular economy**
- The residential market is greening, **starting with social and affordable housing and supported by green mortgages**
- GBCs are working collaboratively with government and in many countries **incentives** are being provided for green building
- **Technology** is being used as an enabler for sustainability
- There is a focus on **healthy people**, including air quality

Trends presenting opportunities

Carbon/energy
efficiency

Residential

Supply chain

Government

Finance

PropTech

When asked about trends GBCs reported climate change, energy transition and energy efficiency were key trends. This has led to a focus on existing building – retrofits as well as performance in operation. GBCs pointed to an increase in the supply of green products and a focus on the circular economy. The residential market is greening, starting with social and affordable housing and supported by green mortgages. GBCs are working collaboratively with government and in many countries incentives are being provided for green building. Technology is being used as an enabler for sustainability, especially among the millennials. There is a focus on healthy people, including air quality.

Trends – opportunities (1)

Energy, carbon and climate change

- Energy transition to renewables (solar, bio-thermal etc.)
- Increased energy costs
- Increased importance of energy efficiency
- **Net Zero commitments**
- Importance of nationally determined contributions (NDCs)
- Increasing awareness of the impacts of climate change
- Corporate accountability & commitments

Residential

- **Affordable housing as an opportunity for sustainability**
- **Incorporation of green building practices into social housing**
- Increasing use of renewables in residential
- Increased awareness among citizens

Supply chain

- Increased use of green products
- Growing industry of certified products
- Life cycle assessment and the circular economy
- Prefabrication and industrialised construction

Trends - opportunities (2)

Government

- Growth in green building regulation
- Incorporating aspects of green building into national construction codes & increasing minimum requirements
- **Government incentives for green building**
- Incentives by local councils
- Mandating green in public buildings
- Increasing awareness at a city/municipality level
- Government targets & aspirations (e.g. halving energy from new buildings by 2030 in the UK)
- Performance based codes
- Professional interest in green building training from the public sector
- Support and endorsement by the government

Finance

- Green finance solutions
- Green mortgages & incentives for green buildings
- Increasing **green investment**
- Growing investor awareness on sustainability benefits

PropTech

- Technology - connection with sustainability
- Smart cities (that are also green)
- Data-driven building insights
- **Digitalisation**
- Millennial generation that accustom and adore smart technology as well having a good awareness on health and sustainable issues
- **BIM/technological increasing construction efficiency**

Trends – opportunities (3)

Existing buildings

- Aging building stock
- **Green retrofits and renovation strategies**
- Focus on existing building
- Ongoing performance improvement (and certification)
- Sustainability in existing building stock
- **Role of Facilities Management**

People

- **Growing interest in human-building relationships**
- **Health & wellbeing**
- Desire to work in productive and healthy buildings
- Air quality

Strategic partnerships

- Building strategic partnerships and collaborating

Membership

- The need for (new) diverse members (finance, insurance, technology) to keep up with changing market trends

Waste

- Increased awareness
- **Recycling and waste management**
- Zero waste

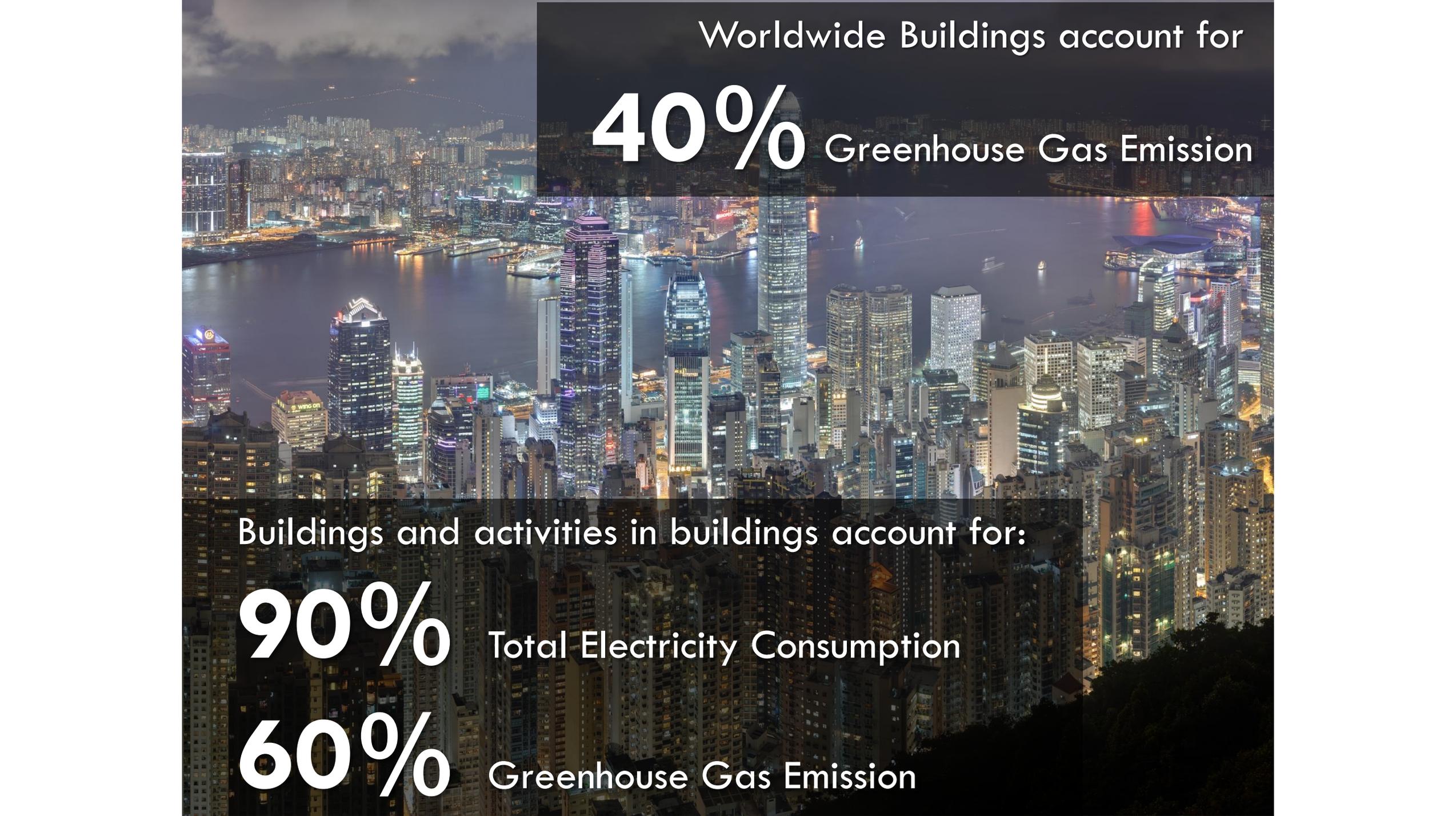
Environment & Water

- Water conservation
- Importance of riparian land

Transport

- Mass rapid transit systems and transit orientated developments

2. Green Building Movement in Hong Kong



Worldwide Buildings account for

40% Greenhouse Gas Emission

Buildings and activities in buildings account for:

90% Total Electricity Consumption

60% Greenhouse Gas Emission

Driving the **GREEN** Building Movement !

Hong Kong Green Building Council

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.



BEAM Plus Assessment Tools

4 BEAM Plus Assessment Tools



**BEAM Plus
Neighbourhood
(ND)**



**BEAM Plus
New Buildings
V1.2
(NB)**



**BEAM Plus
Existing Buildings
V2.0
(EB)**



**BEAM Plus
Interiors V1.0
(BI)**



(Passive Design has been included in this version)

Hong Kong:
**Green
Building in**

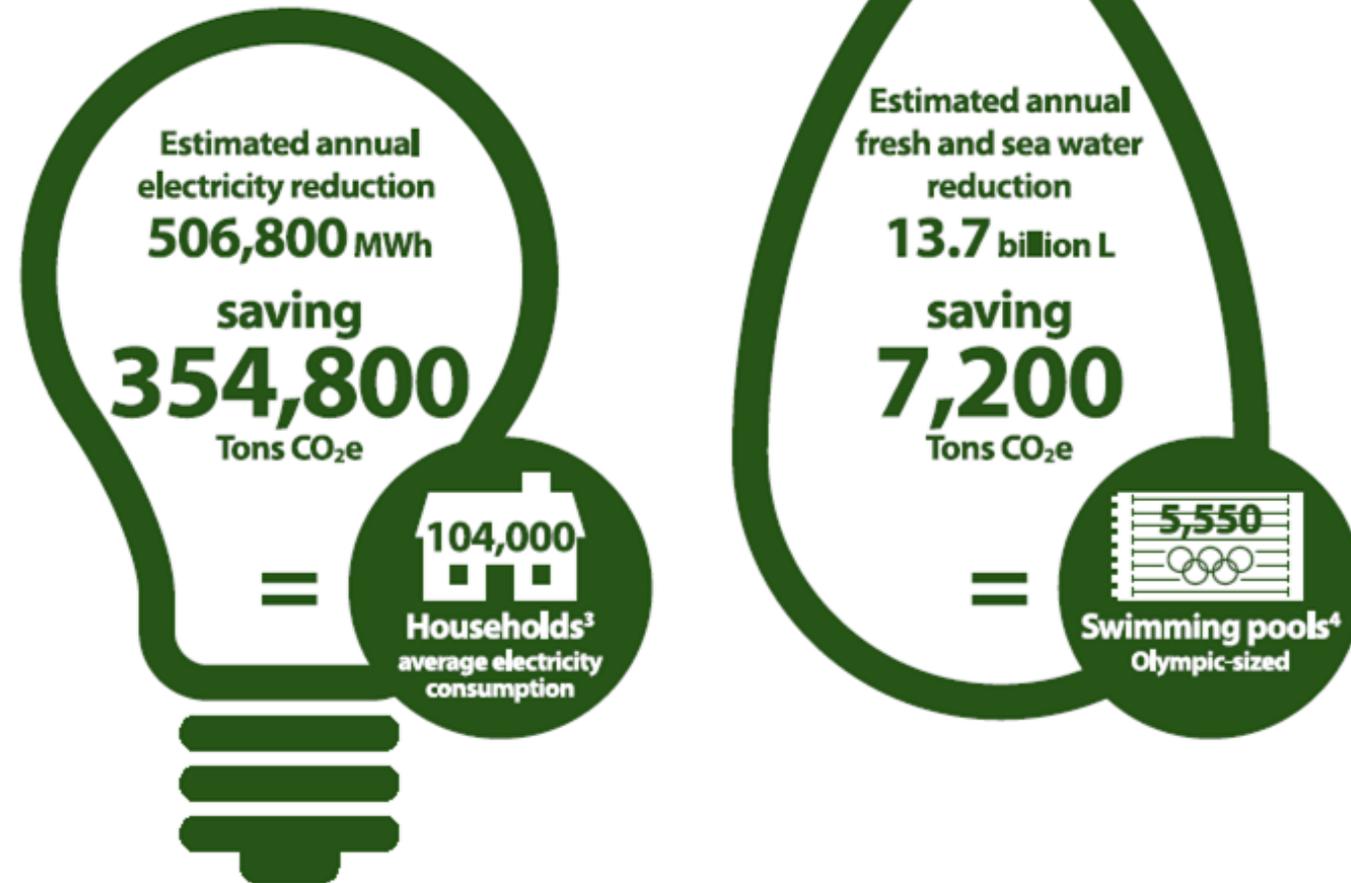
ACTION

A forefront impact report of green building in HK



Combating Climate Change

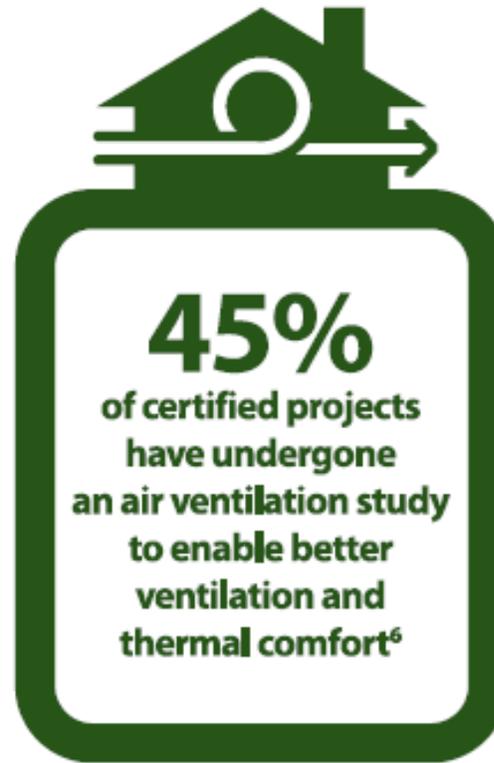
Total saving of BEAM Plus assessed projects compared to the baseline:



Data as of 31 Dec 2017

Liveability and a Sustainable Lifestyle

Pleasant Environment



Walkability and Mobility



Data as of 31 Dec 2017

Community Facilities and Amenities



of certified projects have **nearby recreational facilities**⁸



of certified projects provide **enhanced universal access**⁹

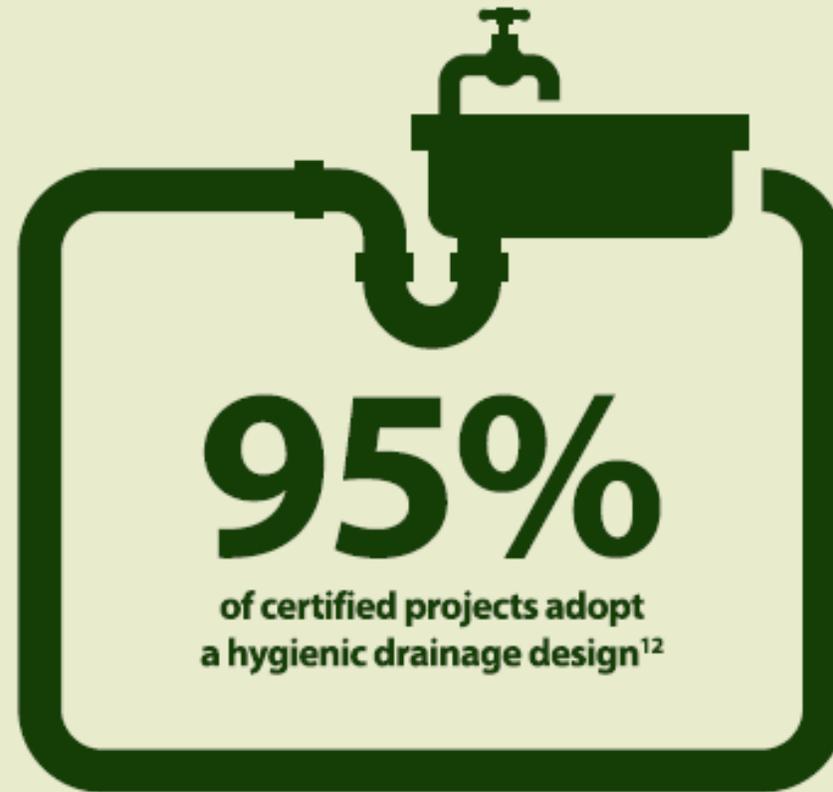


of certified projects are well-equipped with **building amenity features**¹⁰

Data as of 31 Dec 2017

Health and Wellbeing

Excellent Indoor Environmental Quality



Data as of 31 Dec 2017



*Download your copy of
Hong Kong: Green Building in Action
(2017 Edition)*

Let's Build a Collaborative Future for Sustainability.

What do we mean by designing for sustainability?

How to drive design for sustainability?

World Trend:

- Affordable housing as an opportunity for sustainability;
- Incorporation of green building practices into social housing

Take affordable housing as an example, the Hong Kong Housing Authority (HKHA) always has been striving to make rational use of resources, overcoming challenges, bringing passive and low carbon design, total quality, safety & health, sustainability from dreams to fruition. These cover process, products and people aspects.

3. Planting Dreams and Growing Miracles

**“Green and Sustainable” Case Study:
Planning & Design for Sustainability of Quality Public Housing
by Hong Kong Housing Authority**



Core Values, Vision & Mission
Quality = Fitness for Purpose
What gets Measured gets Done!

Our Vision

To **help low-income** families with housing need gain access to affordable housing.

Our Mission

- To provide **affordable quality housing**, management, maintenance and other housing related services to meet the needs of our customers in a proactive and caring manner;
- To ensure **cost-effective** and **rational use of public resources** in service delivery and allocation of housing assistance in an open and equitable manner; and
- To maintain a **competent, dedicated** and **performance-oriented TEAM**.

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CARING CULTURE

Human X Nature

Caring for People

Caring for Environment



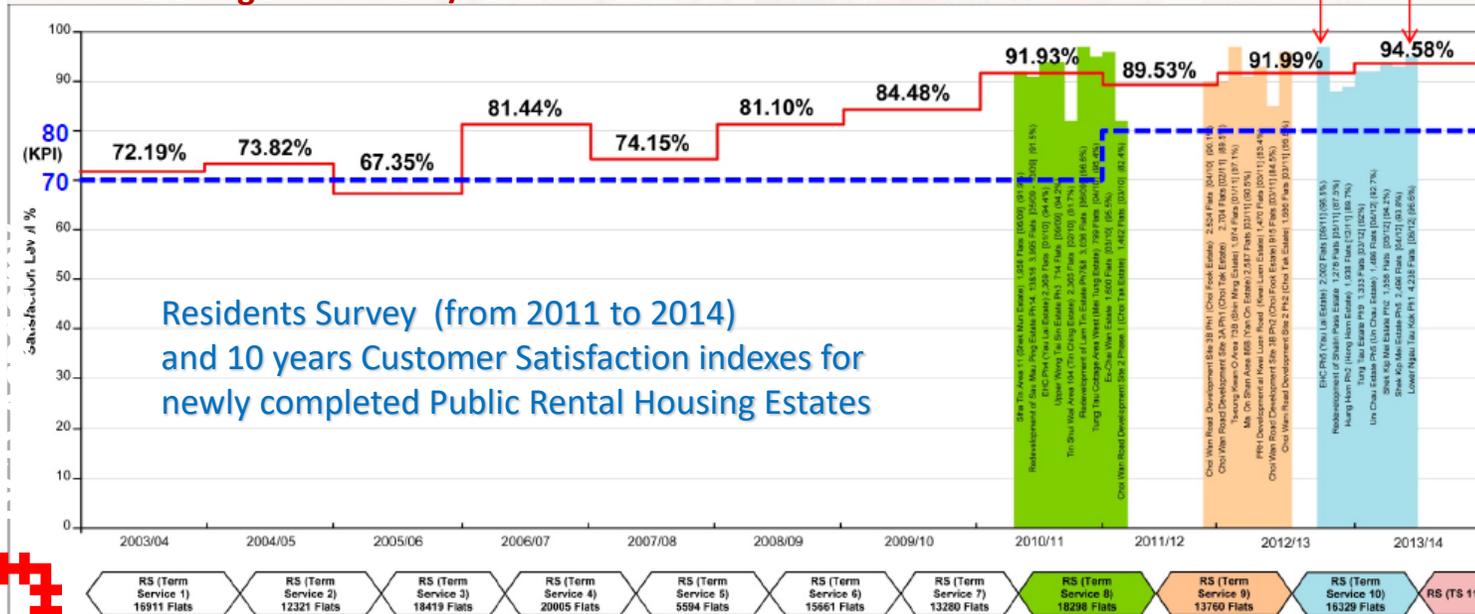
Planning & Design

We deliver the public housing -

- from **Macro** level : City planning and Urban design to **maximize site potential while designing for people with nature in mind**
- to **Mirco** level : Interior space and furniture layout of the domestic flats bringing care and attention to details for **quality living space and services;** and applying **lean design and sustainable construction**

- Satisfaction Indices in 2012/13 is 91.99% & in 2013/14 is 94.58%.

Reaching 97% in 2014/15



Fore-runner of Modular Flat Design

Modular Flat Design

97% Tak Long Estate



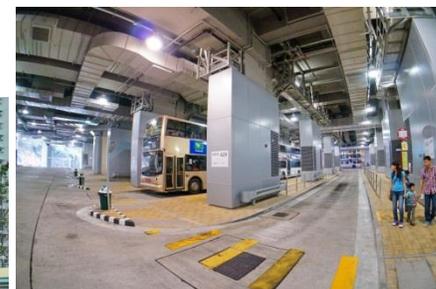
RS (Term Service 1) 16911 Flats	RS (Term Service 2) 12321 Flats	RS (Term Service 3) 18419 Flats	RS (Term Service 4) 20065 Flats	RS (Term Service 5) 5594 Flats	RS (Term Service 6) 15661 Flats	RS (Term Service 7) 13280 Flats	RS (Term Service 8) 18298 Flats	RS (Term Service 9) 13760 Flats	RS (Term Service 10) 16329 Flats	RS (TS 11)
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(a) Planning for People

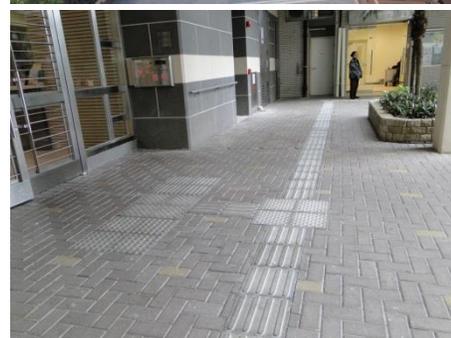
- **Baseline performance** - Hong Kong Planning Standards and Guidelines & Statutory
- **Consult Stakeholders** - other Government Departments, District Councils and Local community
- **Comprehensive approach** – transport, car parking, community centre, social welfare, educational and commercial facilities, pedestrian circulation, local open spaces and landscaping etc.



Public transport terminus and pick-up areas linked up with covered walkways and lift towers



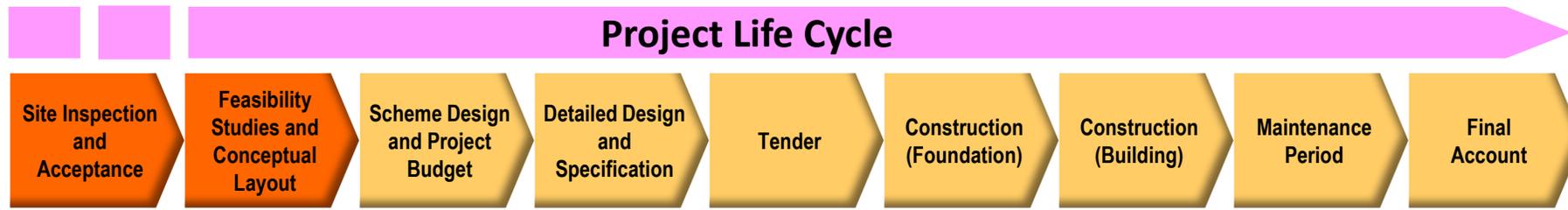
Tactile Guide Path System at strategic locations of housing estates to lead people to domestic blocks



(b) Designing for People with Nature in Mind

1. *Ensure public health and safety, living in comfort and convenience*
2. *Host of Technical studies helping designers to integrate passive design elements holistically and refine the estate layout and building disposition*
3. *A balanced design assuring social, economic and environmental sustainability, maximizing development potential, fast tracking the delivery of public housing*





- **Technical Studies for Potential/New Housing Sites**

1. Air Ventilation Assessment
2. Microclimate Studies
3. Retail Viability Study
4. Project Feasibility Studies
5. Architectural Feasibility Studies
6. Site Potential Studies
7. Visual Impact Assessment
8. Heritage Impact Assessment
9. Ecological Assessment
10. Land Use Studies
11. Planning and Engineering Study
12. Environmental Assessment Study
13. Air Quality Objectives Assessment
14. Odour Assessment
15. Chimney Emission Impact Assessment
16. Traffic Impact Assessment
17. Drainage Impact Assessment
18. Sewerage Impact Assessment
19. Land Decontamination Study
20. Ground Assessment
21. Natural Terrain Hazardous Study
22. Potentially Hazardous Installations Assessment
23. Tree Survey
24. Condition Survey for Existing Building
25. Land Surveying
26. Archeological Study



Noise Mitigation to Create Quiet Living Environment

At Source



Low noise road surfacing

At Propagation Path

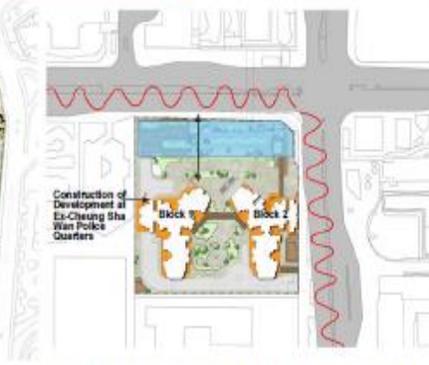


Noise Barrier

At Receiver End



Building setback



Flat configuration & Disposition



Noise Enclosure



Non noise sensitive building



Acoustic Balcony



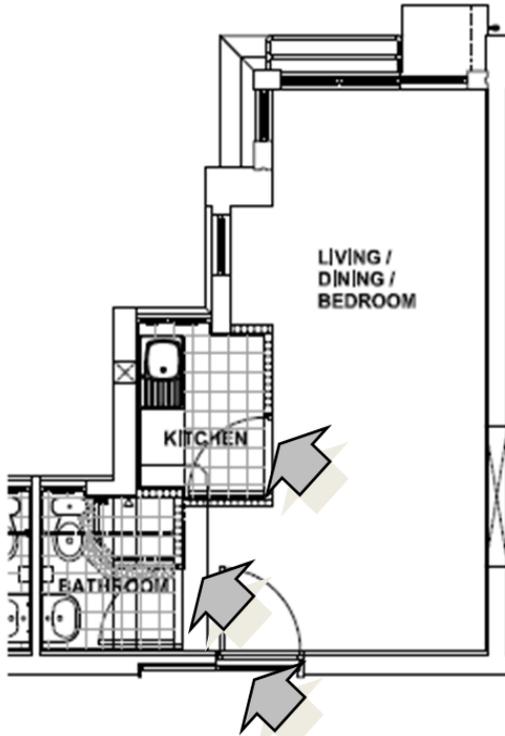
Acoustic Windows

- Compliance Considerations
 - Value for Money
 - Site & technical constraints → A **Balanced Solution**
 - Urban Design Aspect



(c) Universal Design for People of All Ages and Abilities

Barrier Free Access (Inside Flat)



Widen door width –
800mm (flat entrance)
750mm (kitchen and bathroom)



- Power socket at **1m** from ground
- Lever or D-type door handle
- Large lighting switch and door bell

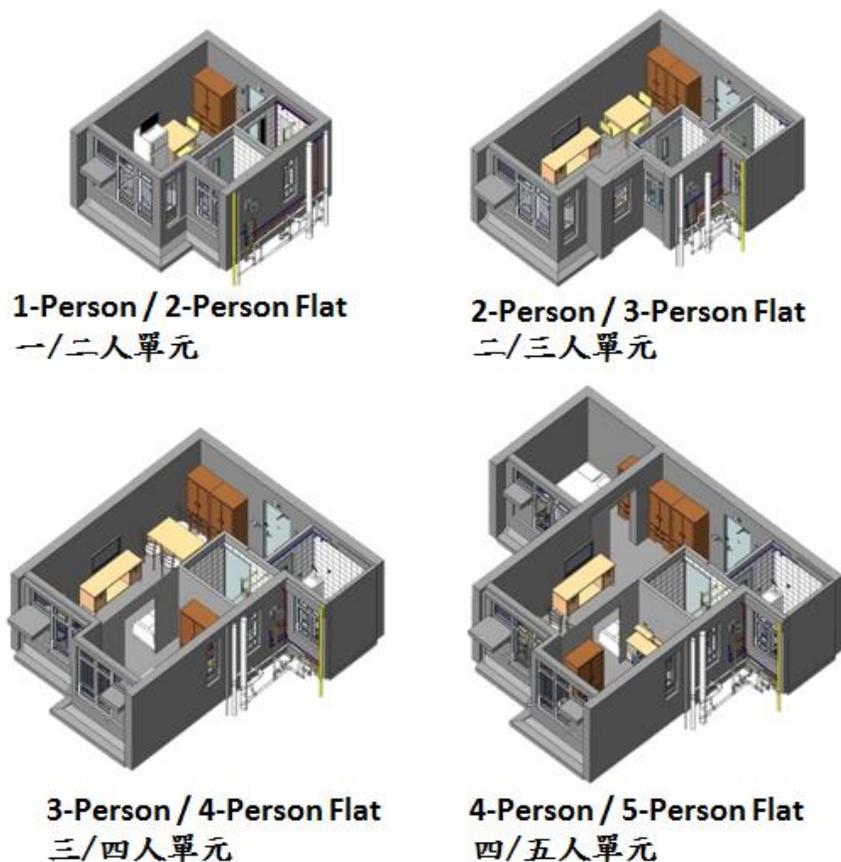


- Appropriate height for lighting switch, door bell and power socket
- Lever type sink mixer
- Leveled entrance



(d) Improving Habitable Space & Enhancing Buildability

Since 2000, due to limited availability of land resources, the topography, size and configuration of housing sites, we **change from Standard Block Design to Site Specific Design with Modular Flat Design.**



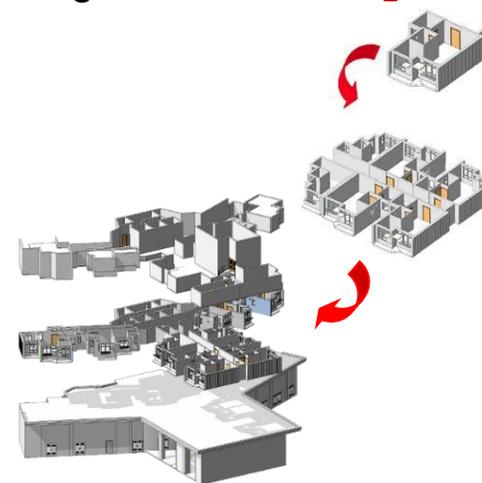
4 Types of Modular Flat Design

developed in 2008 with reference to the allocation standard



Functional & Cost Effective Design (Quality Housing Initiatives)

- 1 Enhanced **Buildability**, Consistency and Economy of Scale
- 2 Better **Healthy Living**, **Safety** and **Easy Maintenance**
- 3 Focus on Customer Needs & continuous enhancement
- 4 Reinforcing **Universal Design**



(e) Improving Energy Efficiency, Saving Water & Enhancing Healthy Living

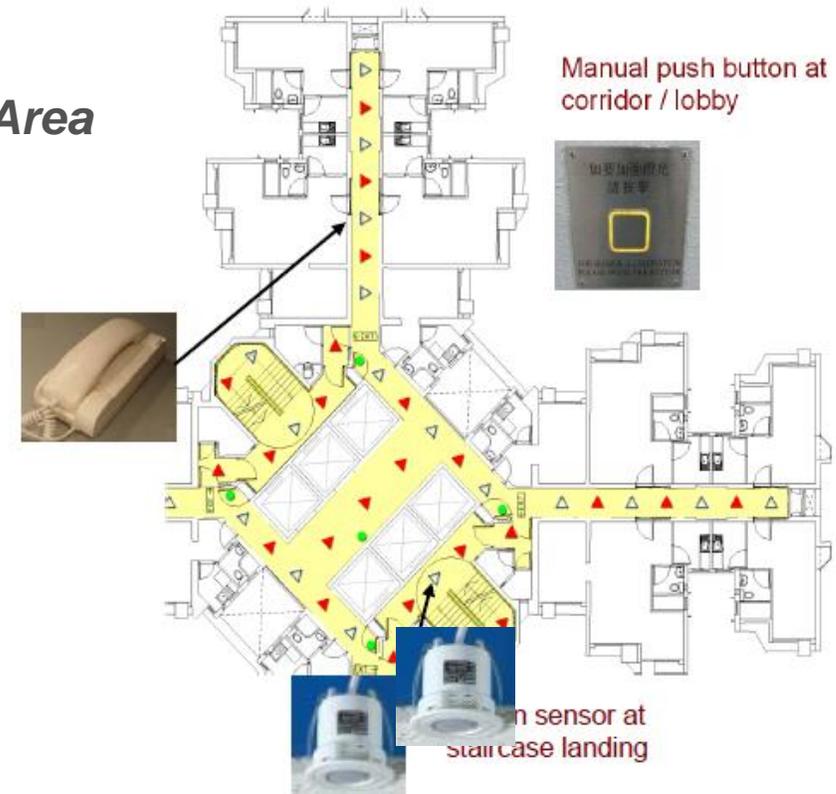
□ Renewable Energy Installation – Grid Connected Photovoltaic System

- Where feasible, we install at the upper roof and roof on lift machine room floor, **generating about 2.5% energy for the communal areas.**



□ Energy Saving Initiative – Two level lighting design in Common Area

- Enable high efficiency lighting and saving in electricity
- Implemented since 2008, we maintain a **minimum lighting level for safety and security**; while the manual switch integrated with the door phone handset in each domestic flat and the provision at strategic positions at the lift lobby and corridors **enable the required illumination level up to 85 lux**



(f) Greening for Healthy Living and Avoid Urban Heat Island Effect

Greening offers **better air quality** and avoids **urban heat island effect**, aside from ecological and amenity value. We -

- **maximize** greening in new estates
- **planting at least one tree for every 15 flats**
- **greening ratio: at least 20% (up to 30% for larger sites)**
- **providing “Community Farm” in every new estate**



The Kai Tak Development in Kowloon City has adopted the green and healthy environment as one of the key features in the design theme of “Homes in the Park” with an overall greening ratio over 30%.



ACHIEVE SUSTAINABILITY

ACHIEVE SUSTAINABILITY

Healthy Living for People, Easy to Build & Easy to Maintain

Precast Fabrication

- **30% by volume of concrete is precast components** including volumetric bathroom, façade, staircase, semi-precast slab and additional precast elements proposed by Contractor

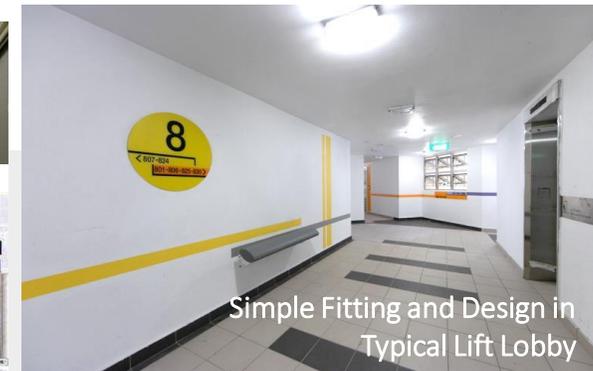


Standard Fittings and Design for Easy Maintenance

- **Concrete Staircase** to provide safe access to upper roof
- **Twin Water Tank System** to provide uninterrupted water supply to tenants when one of the compartments is being cleaned
- **W-Trap System** to avoid drying up water seal to prevent the spread of disease, waste water from wash basin/ shower is directed to replenish the common W-trap connected to the floor drain
- **Stainless Steel Water Pipes** are used in common areas



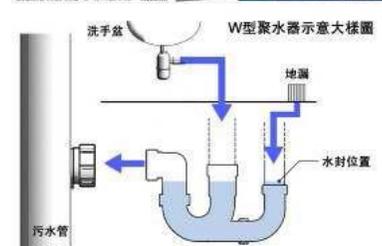
S.S Water Pipe



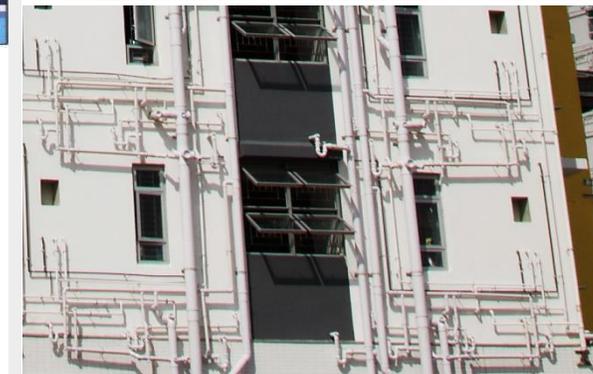
Simple Fitting and Design in Typical Lift Lobby



Concrete stair for maintenance access to upper roof



W-Trap System for Healthy Living

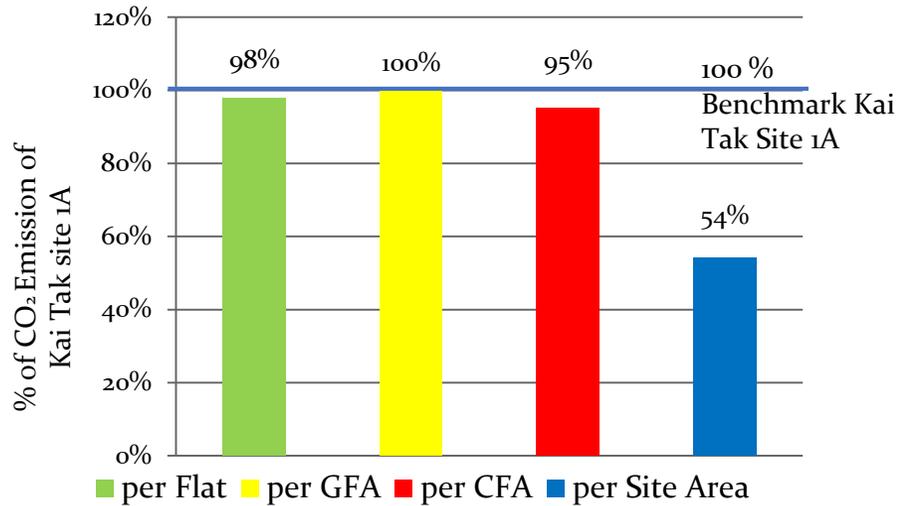


REDUCE CO₂ AND INCREASE O₂



Carbon Emission

HKHA has developed Carbon Emission Estimation tool. In estimating CO₂ emission of buildings, we focus on the CO₂ emission associated with major construction materials and building operations for a **building life of 100 years**.



CO₂ emission of Hung Fuk Estate is compared against a BEAM Platinum Benchmark Estate (Kai Tak Site 1A), none of the aspects are exceeded.

Aspect	Embracing
I : Materials Consumed During Construction	<ul style="list-style-type: none"> ✓ Timber formwork for substructure & superstructure ✓ Steel formwork for superstructure
II : Materials for Building Structure	<ul style="list-style-type: none"> ✓ Concrete for substructure & superstructure ✓ Steel for substructure & superstructure
III : Communal Building Services Installations	<ul style="list-style-type: none"> ✓ Lighting, Lift, Water Supply, Security, CABD, A/C & Ventilation, Fire Services, Electrical Distribution System
IV : Renewable Energy	<ul style="list-style-type: none"> ✓ Solar and/or wind powered system
V : Trees Planting	<ul style="list-style-type: none"> ✓ Trees taller than 5m
VI : Demolition	<ul style="list-style-type: none"> ✓ Dismantling of building ✓ Transportation of building debris from site to landfill



Green Initiatives



- **Total green planting area over 14,000 m²** to reduce heat island effect.
- **327 bicycle parking** spaces are provided in the estate to encourage green living.
- **Green Corners** are provided at G/F Entrance Lobby of every domestic block and Estate Management Office.



Saving Resources

Smart Use of Materials



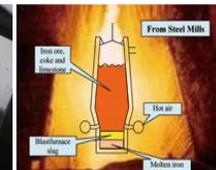
Transfer of C&D Waste Materials

- Established an inventory on quantities of C&D materials available from each site.
- Facilitate bulk transfer between HA's contracts.
- Over **80,000** tonnes of C&D waste have since been reduced



Use of Recycle Materials

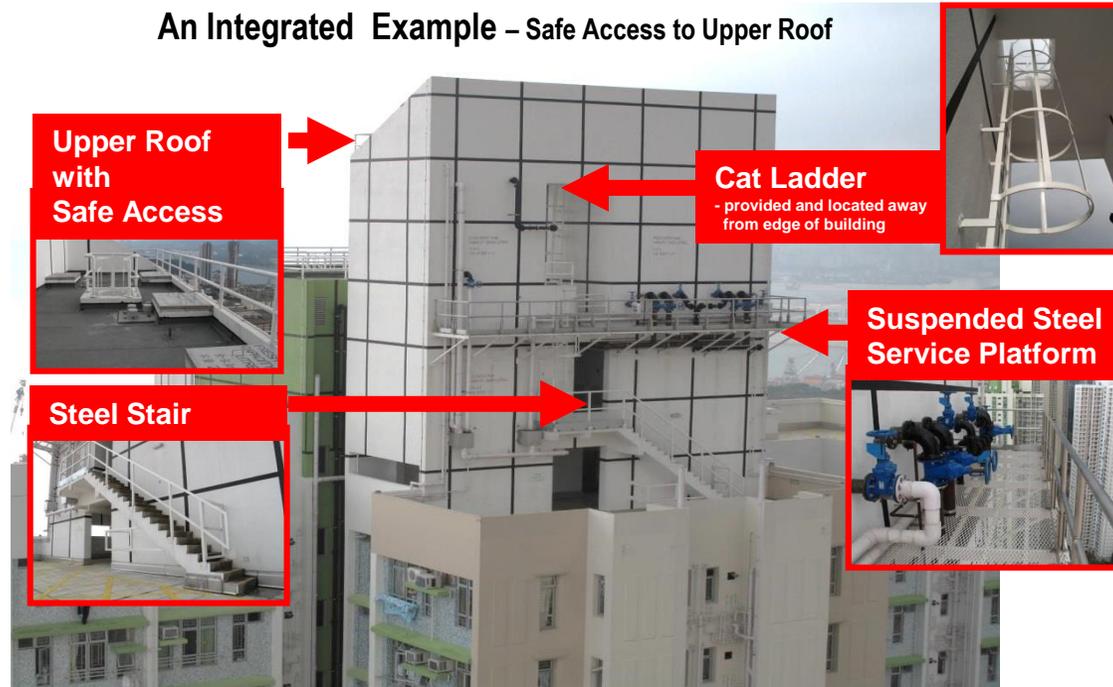
- Marine mud
- recycled glass & aggregates
- bore-logs
- **GGBS**
- recycled excavati...



SUSTAINABLE USE & MAINTENANCE

Design for Safety : Caring for Workers & End Users

An Integrated Example – Safe Access to Upper Roof



ENGAGE PEOPLE FOR RESULTS

ENGAGE PEOPLE FOR RESULTS

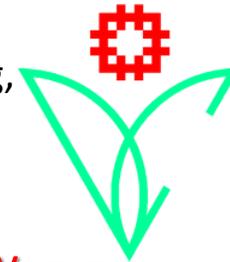
Sharing Knowledge in Office : Corporate Achievement

Staff Training

- We have **>200** BEAM practitioners



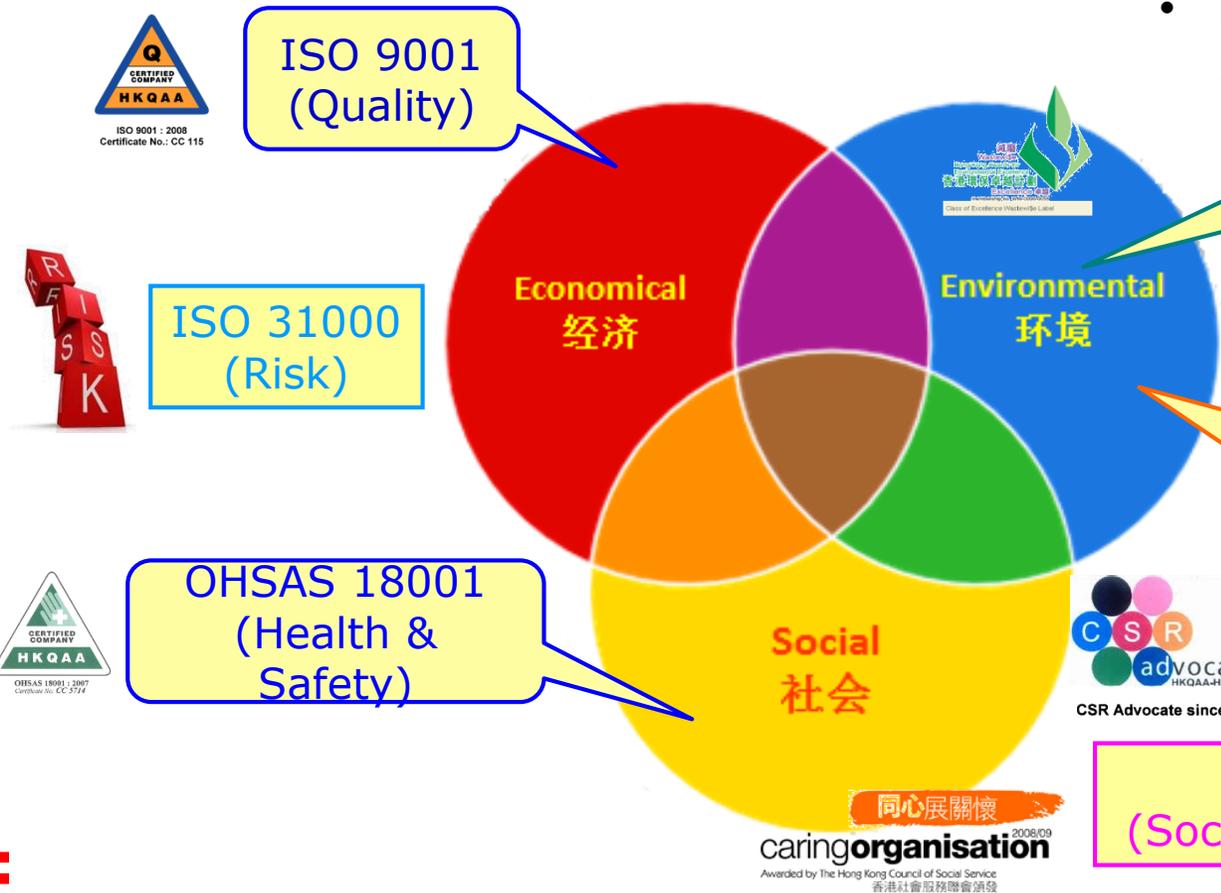
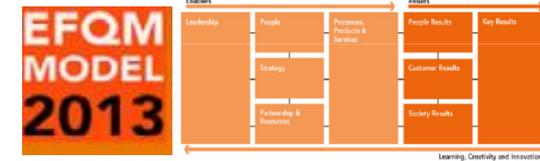
- Direct **involvement in community** environmental projects
- Environmental activities** – organic farming, donate used goods; reduce energy, water, paper consumption, green corner display;
- Environmental training – **DCD Academy** 發展 • 建築



A Sustainable Community & Management Systems

To meet present social, economical and environmental needs but **NOT** at the expense of future generations.

Through the **European Foundation for Quality Management (EFQM) Model**, we seamlessly integrate various management principles and practices into our daily operations (deployed since 2008).



- Implementing **carbon emission estimation** (CEE) for buildings with life cycle of 100 years

ISO 14001
(Environmental)



ISO 50001
(Energy)



- Annual **Sustainability Reporting** according to Global Reporting Initiative (GRI)



ISO 26000
(Social Responsibility)



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Green Building Leadership



Our Core Values: **C**aring, **C**ustomer-focused, **C**reative, **C**ommitted

We Care

- We care for the **environment**
- We care for the **people**:

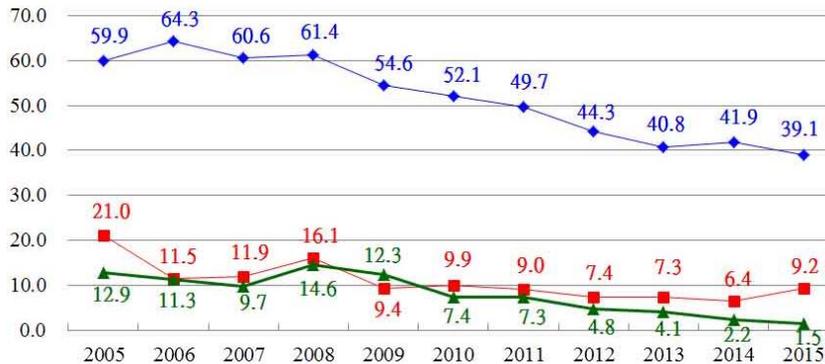
Safety **Health** **Security**

Well-being **Comfort** **Convenience**

- Together we build a **sustainable and harmonious community**

Key Performance Indices

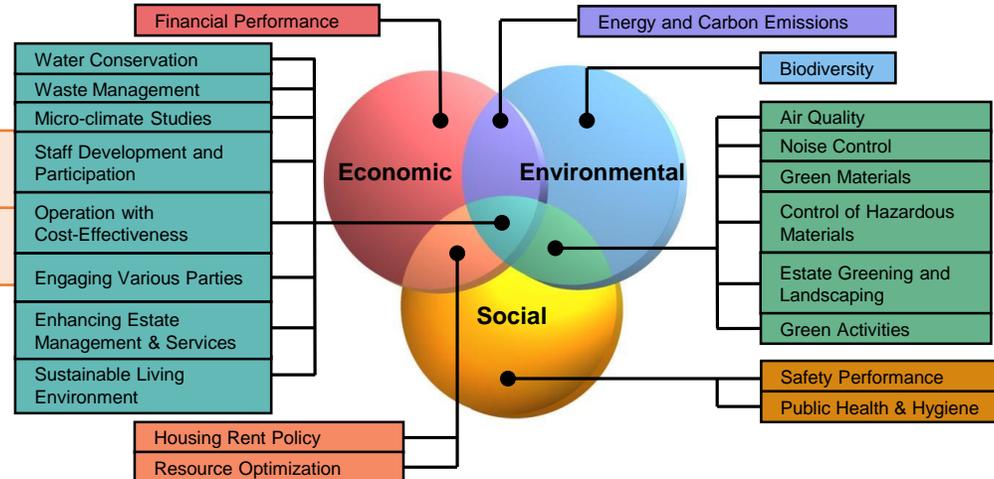
- 34%** less costly than private sector
- 30%** less construction waste
- 75%** lower accident rates



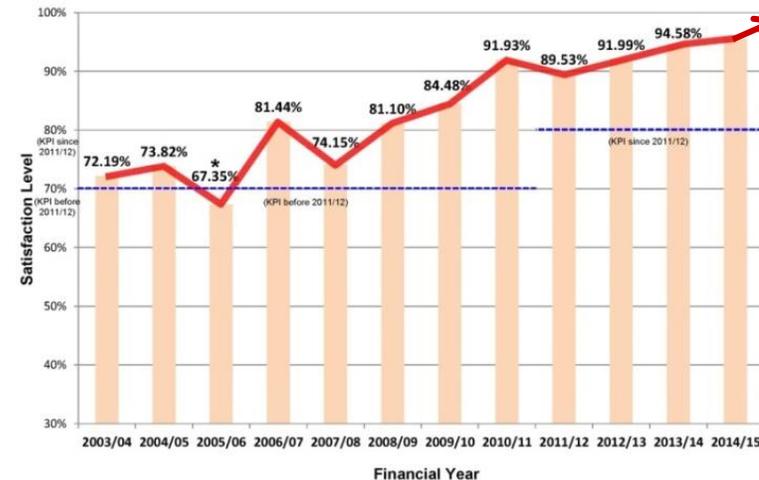
Source of information: Census & Statistics Department and Housing Authority Site Returns

Please read our Sustainability Report

<http://www.housingauthority.gov.hk/mini-site/hasr1415/common/index.html>



- Customer satisfaction index rises, with max. of **98.1%**



Please take a look at our sustainability video

http://www.housingauthority.gov.hk/hdw/video/videoshell_Environmental_corporate_Cant.html

Exemplary Project

Hong Kong Housing Authority's

Hung Fuk Estate

(Quality Building Award 2018; Green Building Award 2016)





洪福邨

HUNG FUK ESTATE is located in a low density rural area of Yuen Long district. It is about **327m** from Hung Shui Kiu Light Rail Station.

The Site and the Neighbourhood

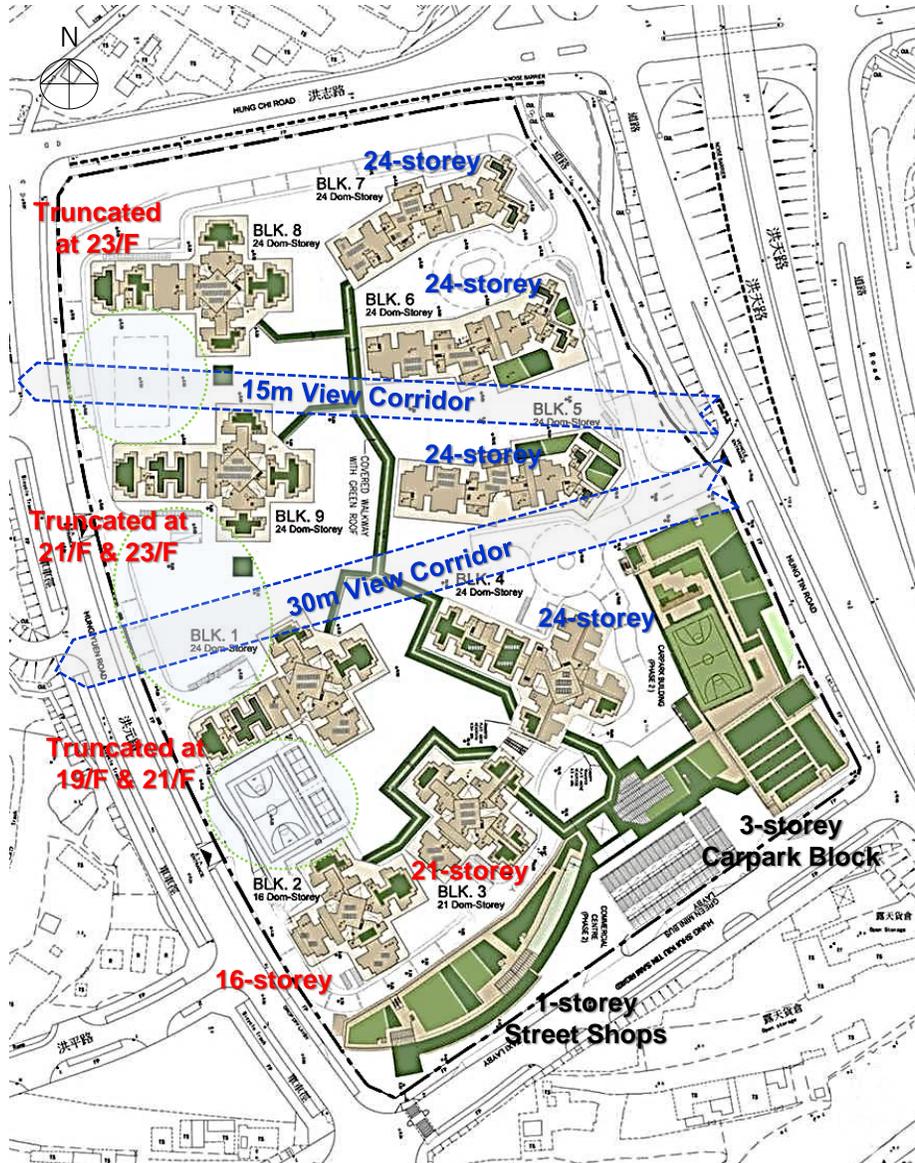
Restaurants, banks, clinic, pharmacy, supermarket, convenience stores, schools, laundry, retail shops, post box, temporary wet market are within 500m walking distance (shown yellow on the location map).



FORE-RUNNER OF A NEW TOWN

Smart Site Planning

An Identity for a New Vibrant Community



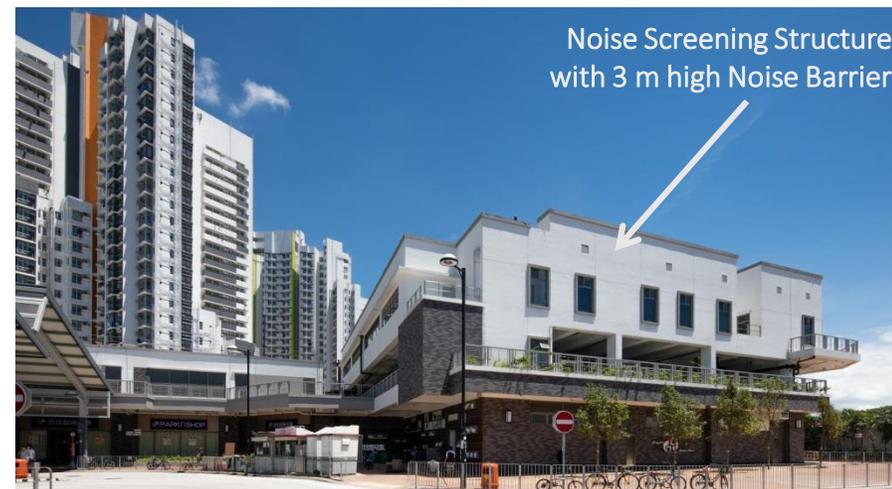
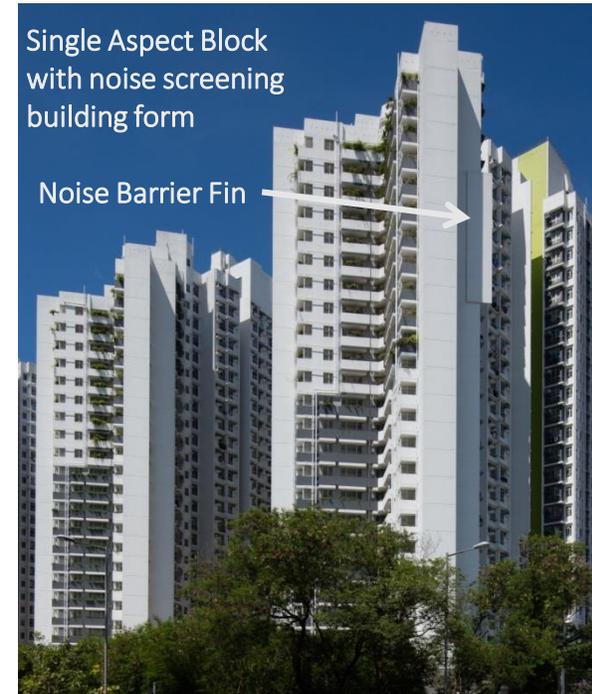
With Considerations on

- Complicated Geotechnical Ground Profiles
- Visual Impacts to the surrounding
- Wind Direction and Sun Path
- Noise Mitigation Measures
- Pedestrian Circulation and Traffic Connection



RESPOND TO ENVIRONMENT

All Round Noise Mitigation - 99% Noise Compliance



BRING BREEZE & LIGHT

Corridors for the WIND



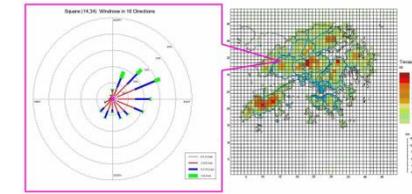
To Enhance Wind :

- Two wind corridors
- Large building separation
- Orientation of blocks in parallel with prevailing wind direction
- Ground floor empty bays

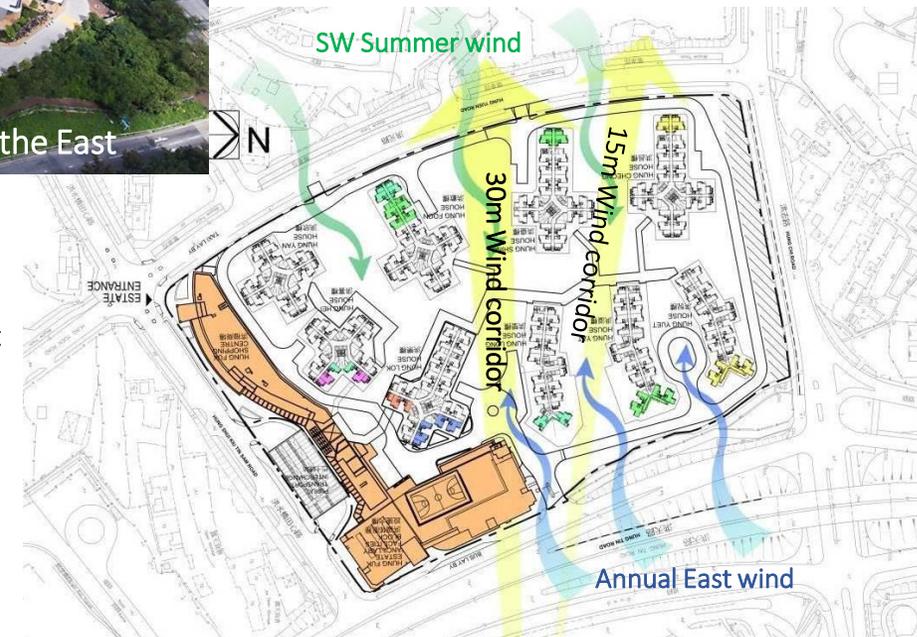
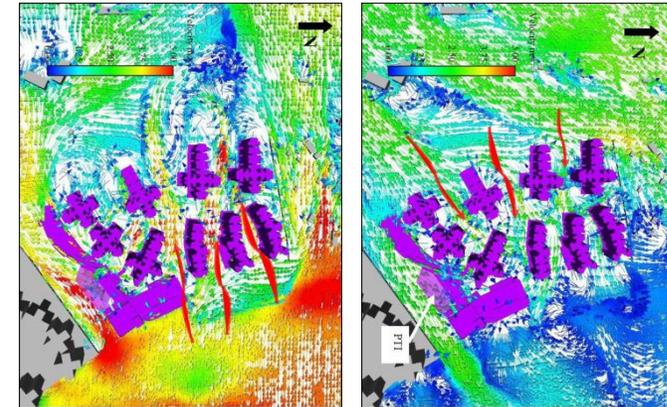
Average wind speed at pedestrian level

- ranges from 1.2 to 3.1 m/s under summer South-west wind.
- around 2.5 m/s under annual East wind.

Comparing with a baseline scheme, the design results **37.8% improvement** in wind velocity ratio within the development.



Computer Simulation on Wind Performance



RESPOND TO ENVIRONMENT

Let's play with the Sun

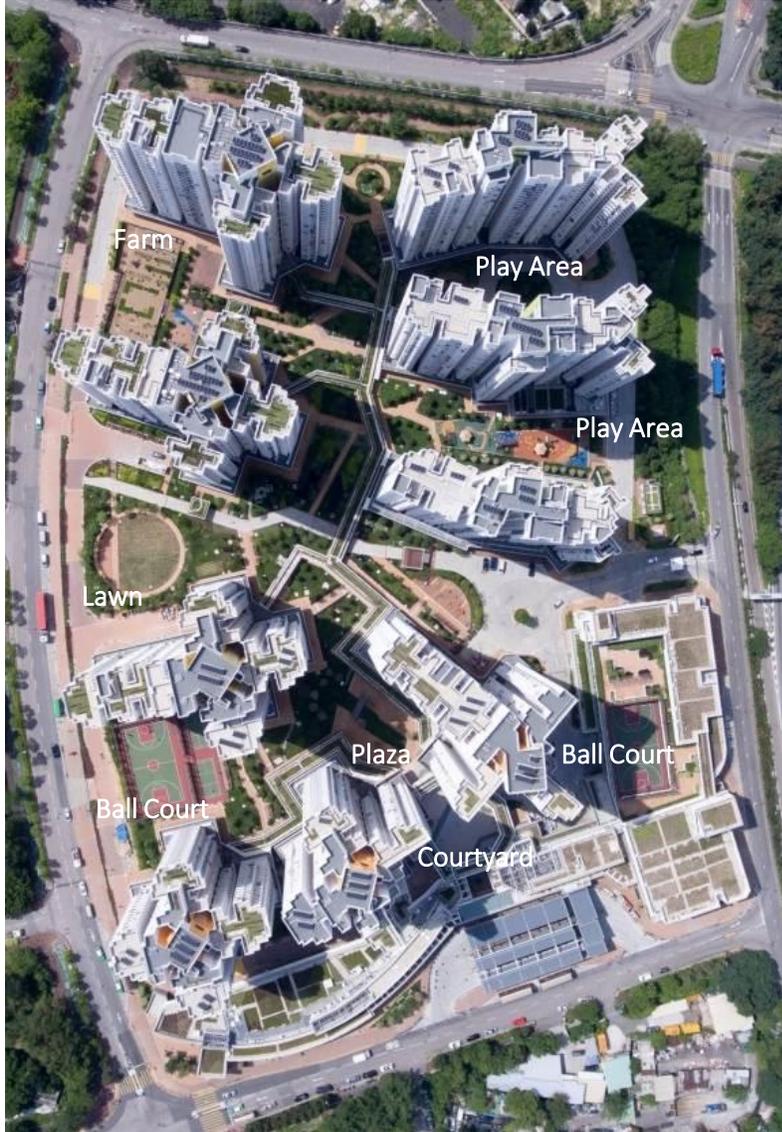
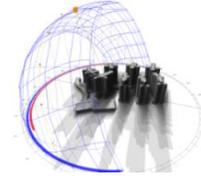
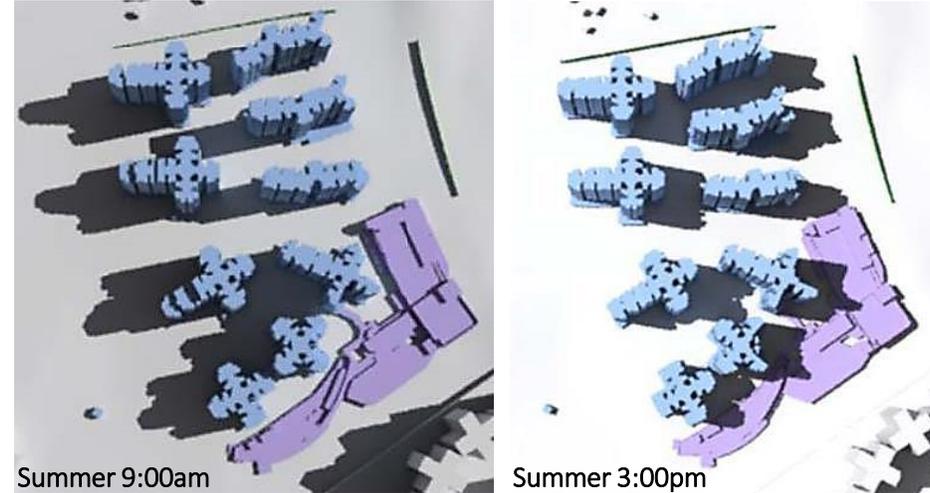


Photo taken at 3:30pm in Summer

Analysis on Sun Path and Shadowing Pattern



Planning of Activity Space

- One basketball court is on the East and the other one on the West, both are orientated along North-south axis to minimize glare effect.
- Children Play Areas are planned on the East, as most kids play in the afternoon.
- Community Lawn Area are Community Farm planned on the West, as plants enjoy strong sunshine.
- Entrance Plaza and Courtyard are planned in the middle where community activities are always under shade most of the day.

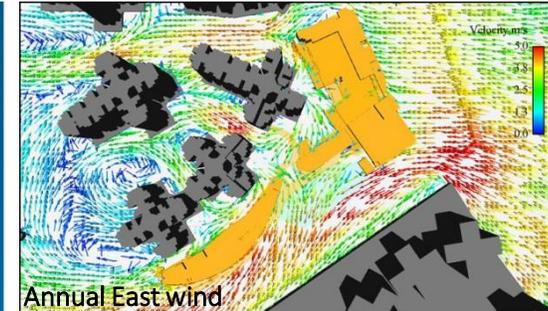
RESPOND TO ENVIRONMENT

Comfortable Shopping under Verandah with Natural Light and Breeze



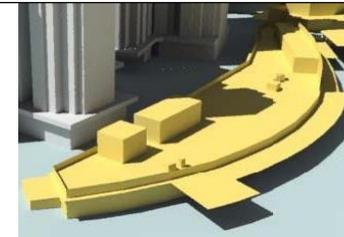
Retail Facilities:

- 3 Restaurants
- 10 Retail Shops
- Clinic
- Supermarket
- Wet Market



Gap between buildings and street helps to make the leeward side of the area **adequately ventilated** at ground level.

Shadowing Pattern of Shopping Centre at 3:00pm in summer



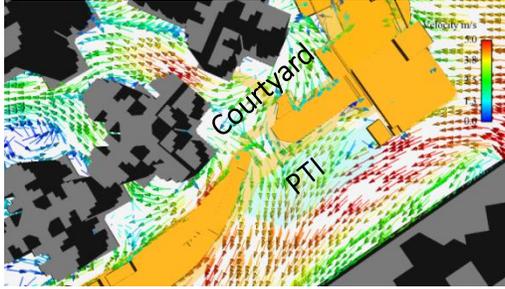
Large canopy along the street

- No air-conditioning required for public area
- No direct sunlight exposure to the shop fronts
- **Comfortable shopping experience along the STREET**



BRING BREEZE AND AIR

Interactive Plaza Connects People with Comfort and Convenience



Passing the street shops and the Public Transport Interchange, arriving at the entrance courtyard, here is the doorway to Hung Fuk Estate.

- The courtyard & plaza are cleverly created by linking up the covered walkway and the shopping verandah.
- It brings breeze (wind speed of 3.8m/s)
- It brings a sense of arrival
- It brings an identity to the estate



1 – Entrance Courtyard



2 – Entrance Plaza



3 – Arrival in Estate

PASSIVE DESIGN : BRING BREEZE & LIGHT

A Weather-proof Open Air Public Transport Interchange

Courtyard design not only brings breeze effectively, it also enhances air movement downstream helping the dispersal of pollutant from buses by natural means.

Roof cover design allows natural ventilation, penetration of natural lighting and provides shelter in wet weather



A ✓ TO KICK NOISE INNOVATION

Pilot Public Transport Interchange Cover Design

Design of the PTI cover effectively kicks off noise impact to sensitive receivers. The solid and transparent roof pieces are **cleverly** tilted at an angle, and each them is not more than 230m², such that

- No installation of mechanical ventilation system is required.
- No installation of sprinkler system or any other fire services system is required.
- No artificial lighting is required in the day time.
- No energy is required for the operation of the PTI (except for lighting at night).



The cover also kick noise for future development .



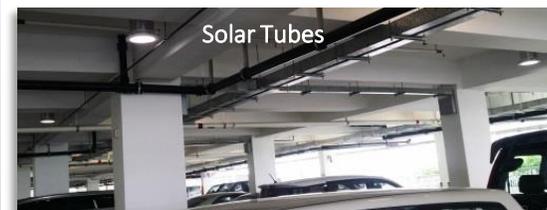
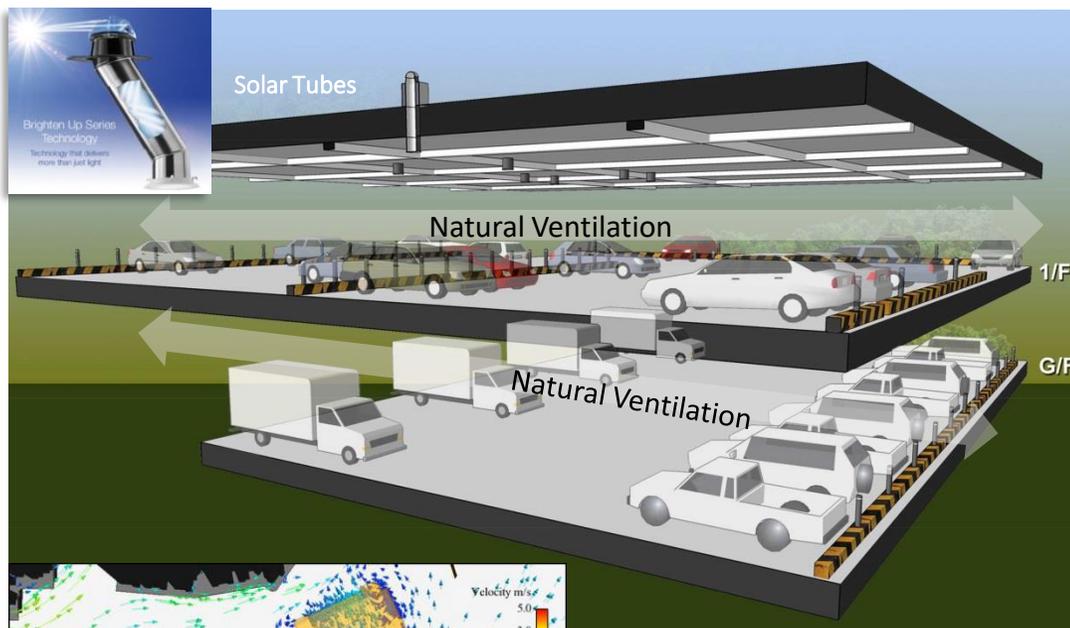
Upon completion, noise performance was verified by on-site measurement and the result was satisfactory

*PASSIVE DESIGN : BRING BREEZE & LIGHT
AND ASSURING SAFE ACCESS FOR MAINTENANCE*

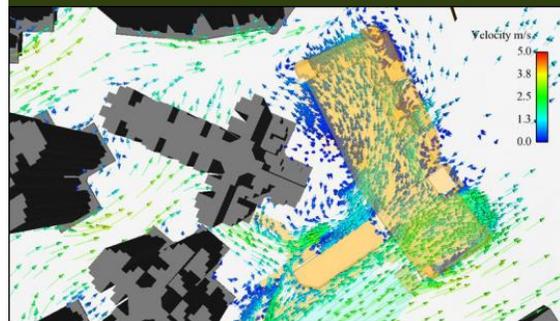


BRING BREEZE AND SUNLIGHT

A Breathing Carpark with Green Initiatives



電動車充電站用戶指南
ELECTRIC VEHICLE (EV)
CHARGING STATION USER GUIDE



Natural ventilation performance in carpark

- **80%** of the carpark perimeter wall is **open parapet**, allows for natural cross ventilation which is sufficient to remove pollutant, without any mechanical means.
- **8 Nos. of Solar tubes** are installed at soffit of carpark to bring in natural sunlight. Photo sensors to control operation of artificial lightings are provided.

30% of the parking spaces are equipped with elec. charging facilities, conduit is allowed for **100% elec. charging parking space in the future**

A NEW COMMUNITY

Comprehensive Social Welfare and Recreational Facilities

- Integrated Children and Youth Services Centre
- Neighbourhood Elderly Centre
- Hostel for the Moderate Mentally Handicapped
- Integrated Vocational Rehabilitation Services Centre
- Kindergarten.

Active Recreation Facilities

- Basketball Courts
- Badminton Courts
- Table Tennis
- Community Play Areas

Passive Recreation Facilities

- Community Farm & Lawn
- Mini-woodland
- Recycle garden
- Leisure & Cultural Activity Areas

Transport Facilities

- Public Transport Interchange
- Carpark
- Taxi & bus Lay-bys
- Signalized junction for pedestrian crossing



BRING BREEZE AND LIGHT

Passive Design Performance



Typical Lift Lobbies & Common Corridors

- Minimum air change rate at typical lift lobby under annual wind is 44.6 ACH
- Minimum air change rate at G/F entrance lobby under annual wind is 22ACH

Domestic Flats

- Ventilation performance of every domestic flat and all common areas are carefully analyzed by computational fluid dynamic simulations
- The ventilation rates of habitable rooms and kitchens, range from 10 to 150 ACH which is well above the min. statutory requirement of 1.5 ACH



- Vertical Daylight Factor of each habitable room and kitchen for each domestic flat are in average ~50% & ~40% respectively which are well beyond requirements in APP-130 (i.e. 8% for habitable room and 4% for kitchen)

ENJOY THE COUNTRYSIDE

Enhanced Ecological Value

Number and varieties of wildlife species..... butterflies, birds and insects are attracted by fruits and nectars of the native trees and shrubs in the area



Total Green Coverage Area **31%**



Constraints

- Low diversity of wildlife
- Limited suitable habitats around to support diverse wildlife
- High disturbance by traffic

Opportunities

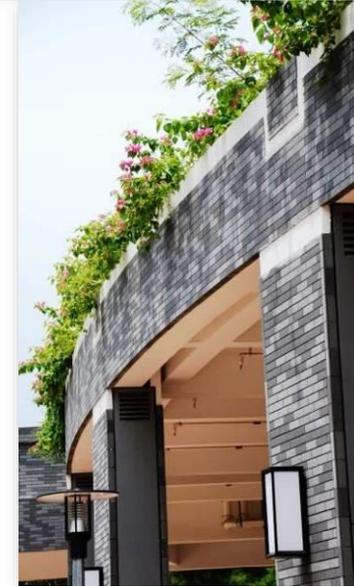
- Planting of native trees and vegetation to enhance ecological value
- **675 Nos. trees, 54% natives**
- **182,708 Nos. shrubs, 34% natives**
- Green roof to provide habitats for wildlife.
- Landscape design to incorporate conservation and education elements.
- Provision of Mini-Woodland, Nature Walk & Butterfly Garden

LIVING IN THE GREEN

Greening Opportunities & Low Maintenance



- **Total Green Roof areas** ~5,000m², with native species of ground cover
- **Total Vertical Greening** ~400m² provided at trellis over sitting areas and basketball fencing.
- **Automated dripline irrigation system** is provided for green roofs, planters along building perimeter

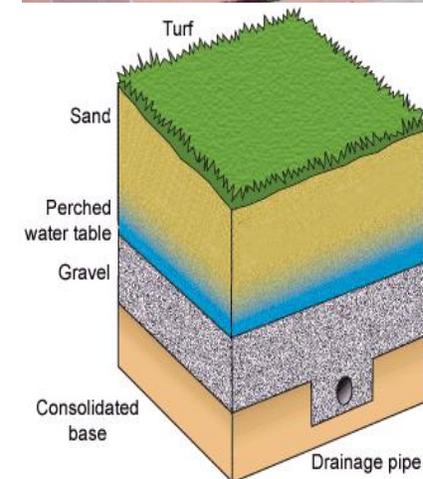


PLAYING IN THE GREEN

“All-sand” Rootzone Profile Design for Lawn

Advanced Method

全沙根質種植方法設計



- The sand layer provides **excellent drainage** and is resistant to compaction.
- The perched water table created at the interface of the sand/aggregate layers can **retain water** in the rootzone.
- This design facilitates the establishment of grass
- It improves the durability of lawn and reduce the need for frequent maintenance.

TREASURE OUR RESOURCES

Reuse Demolished Materials



Demolished
Roadside Planters



Reuse of granites
as pavers



Reuse of granites
as planters

[1] All of the granites (1565 nos.) from demolished street planters were reused as finishes material for planter wall, fence wall and landscape paving, reducing landfill burden



Reuse Materials from Construction Site



Reuse of
tiles in
Recycle
Garden



Reuse of precast
components in Rec
Garden

[2] Building materials such as concrete tiles, steel frames, precast volumetric bathroom & precast façade mock-up were reused as educational displays in Recycle Garden

TREASURE OUR RESOURCES

Save Every Drop of Water.....



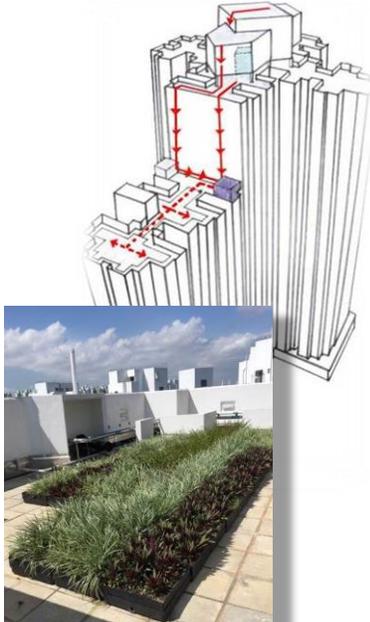
• **Study on Irrigation Systems :**

- ① Zero Irrigation System (ZIS),
- ② Modular ZIS,
- ③ Rootzone Irrigation System,
- ④ Dripline Irrigation System were carried out

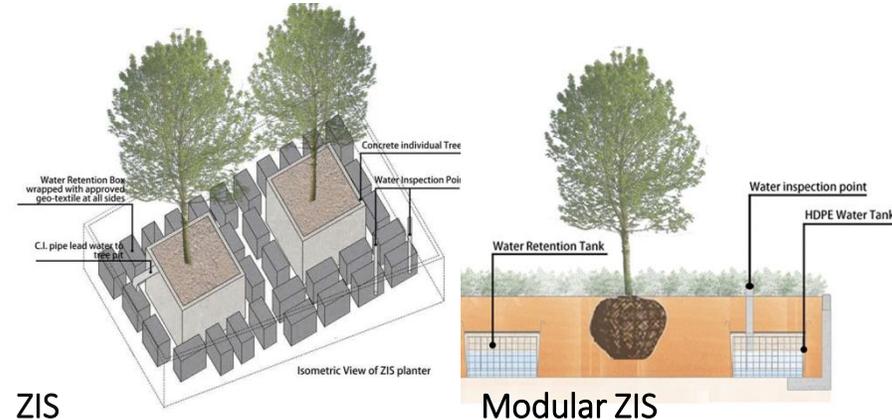
Modular ZIS



Warm reminder in every flat.



Green Roofs



ZIS

Modular ZIS

- **Rain Water Harvesting System** is adopted at roofs of domestic blocks 5 to 7.
- **AC Condensation Water recycling for irrigation for green roof.**
- Automatic irrigation with timer for plants at height.



GREEN AND LEAN CONSTRUCTION

Reduce Construction Wastes

1. **Pay for environmental and site hygiene scheme** was allowed in the Main Contract encouraging the implementation of environmental protection measures.
2. Use of precast concrete components, mechanized construction, steel hoarding to reduce construction waste.
3. **Site offices** were built by reusable components.
4. **5,365m² precast concrete slab** was reused as haul road hard paving in construction sites.
5. **Concrete batching plant** was installed on site for supplying concrete
6. The use of metal formworks was maximized and timber formworks were reused as far as possible.
7. Existing plants from demolished street planters were transplanted to site office and hoarding for greening purpose.



Haul Road



Metal Formwork



Sorting Inert Waste



Recycle Waste Water



Recycling Bins



Solar tubes in Site Office



Green Hoarding



Solar tubes in Site Office



Wheel Washing



Green Site Office

Reduction of
37,376 kg CO₂
emission by site
batching plant



On-site Batching Plant

TREE RECYCLE INNOVATION

Pilot Program to Recycle Felled Tree at Construction Stage

Reduction of
157.5 kg CO₂
emission by
Tree Recycle



1. 200 no. existing trees were felled



2. Felled trees were cut and shredded into wood chips



App. 2500kg
Wood Chips

3. Building contractor worked in collaboration with neighboring school, to promote environmental awareness on recycling food waste and garden waste.



5. 2,623 kg of compost was produced for community farming and soil conditioner



4. Wood chips were used as bulking agent to mix with food/garden waste and decomposed into soil conditioner



LEAN & GREEN DESIGN BY BIM

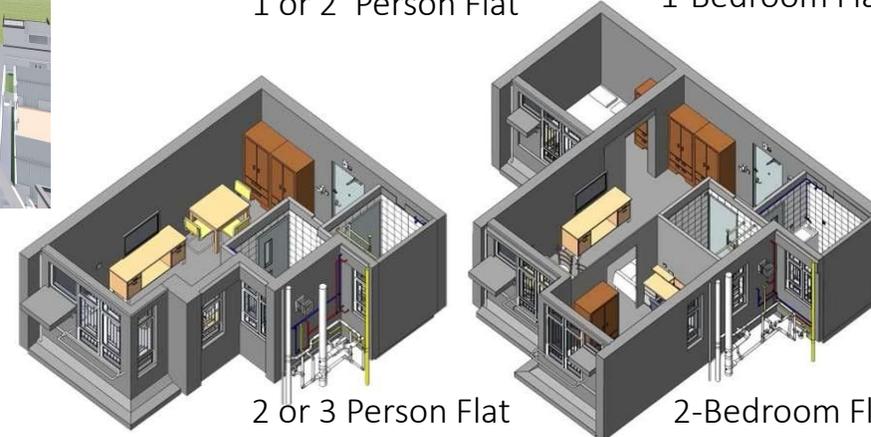
BIM as Design Tool

BIM coordination



1 or 2 Person Flat

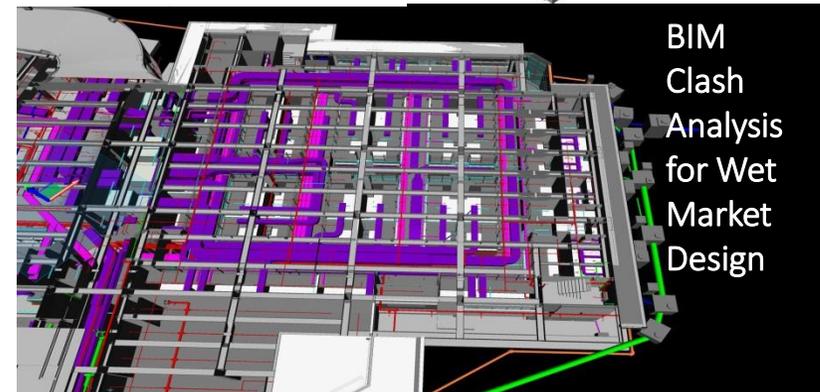
1-Bedroom Flat



2 or 3 Person Flat

2-Bedroom Flat

- **Standard flat modules** were adopted in the block design facilitating pre-fabricated products, reducing construction waste and pollution.
- **Rotational symmetry** in the layout of typical domestic floors was adopted for easier construction.
- **BIM** was used for clash detection prior to construction for minimizing abortive works and maximizing accuracy in material ordering.
- **Fair face off-form finishes** with paint to exterior and with tile/paint to interior.
- **Minimize wet trades** on site by prefabrication.



BIM
Clash
Analysis
for Wet
Market
Design

LIVABILITY & SUSTAINABILITY

Green Facilities for Green Living



Our Environmental Policy is to promote healthy living in a green environment



- **Educational and publicity programmes** to raise PRH tenants' and estate management staff's environmental awareness and encourage them to join hands in building a green community are to be organized.

- **Resident Satisfaction Survey (RSS)** will be conducted to gauge the users' satisfaction level and enhance the design of future estates.



4.3 ★★★★★ 24小時營業
房地產 · Hung Shui, Hong Kong

主頁 評論 關於 帖子 相片 讚好 網



Moon Wong — 5★ 派左向南單位，非常滿意！村內綠化做得好好，環境優美，設施齊備，一應俱全！
2016年4月9日 · 16 則評論
讚好 3 · 回應

Simon Yip — 5★ 這裡的空氣特別清新...！
2016年8月21日 · 1 則評論
讚好 1 · 回應



Positive comments are received and reflected in Facebook page which is established by local residents

WE ARE CARING, COMMITTED, CREATIVE, CUSTOMER-FOCUSED



Forerunner of the future Hung Shui Kiu new town



Building green for healthy community



Provide all the convenience of modern community living



Environmental advances and sustainable initiatives for lively estate

Hung Fuk Estate video



Outcome : Happy, Healthy, Satisfied Residents

A balanced design assuring social, economic and environmental sustainability of public housing



World Trend:

BIM/technological increasing construction efficiency

Building a Collaborative Future :
Act Smart. Let's Go for BIM!

CIC's Support to the Industry

- Created by the industry and for the industry, **CIC** has long been supporting and coordinating the local construction industry in promoting the implementation of BIM technologies since 2012
- **CIC** has been formulating strategies and implementation roadmap for market transformation, promoting and facilitating the application of BIM in Hong Kong.
- **CIC** takes the word '**BIM**' in a wider sense to include BIM, digital construction and the related technologies in the industry which now cover the **AECO** (**A**rchitecture, **E**ngineering, **C**onstruction & **O**wner-operated) Community.



CONSTRUCTION
INDUSTRY COUNCIL
建造業議會

CIC as Coordinator in BIM Development

Professionals / Specialists



Academia



Project Clients

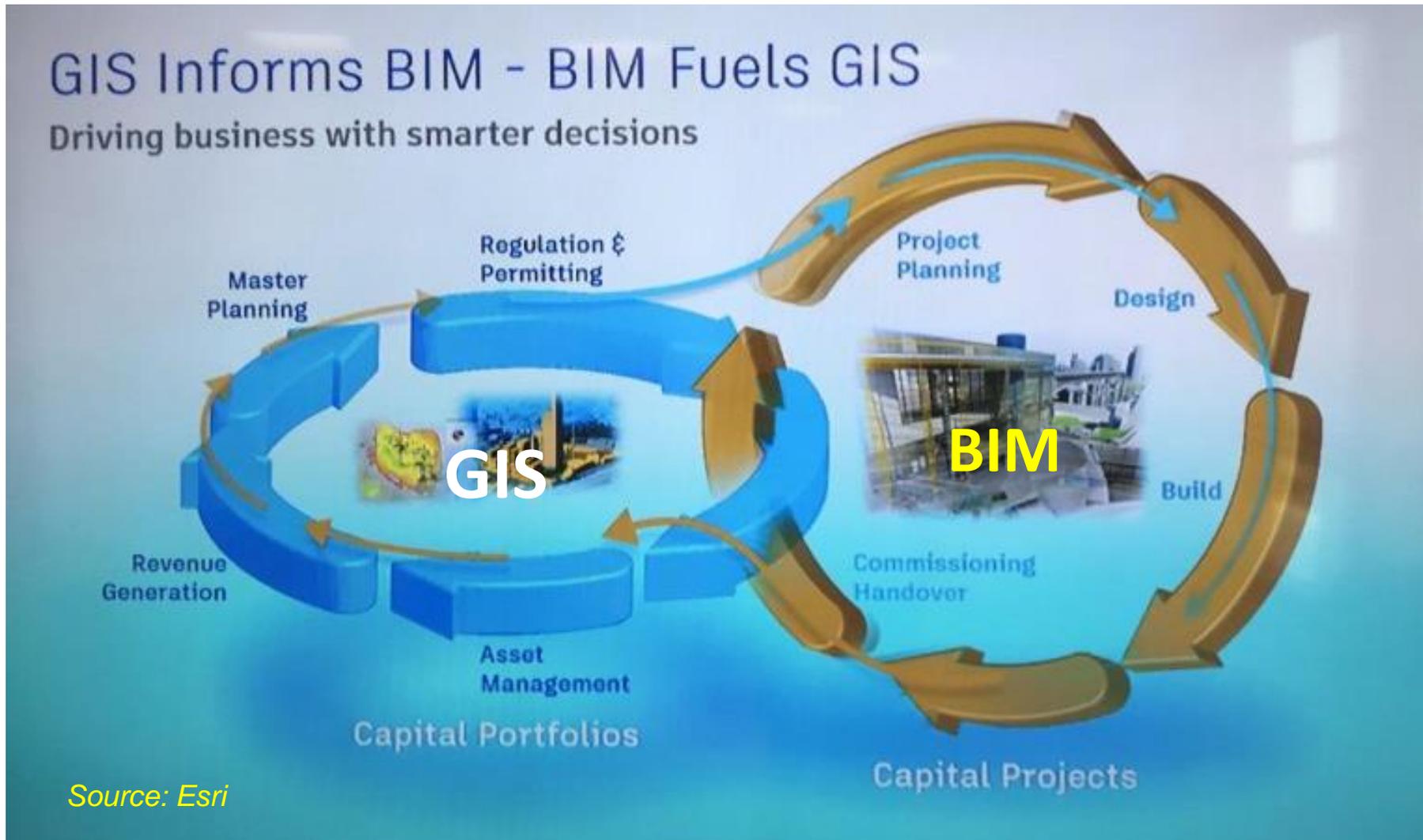


- There are two types of BIM drivers in the global arena:
(1) Those who dare to dream at strategic level, and
(2) Those who set standards at the technical level.

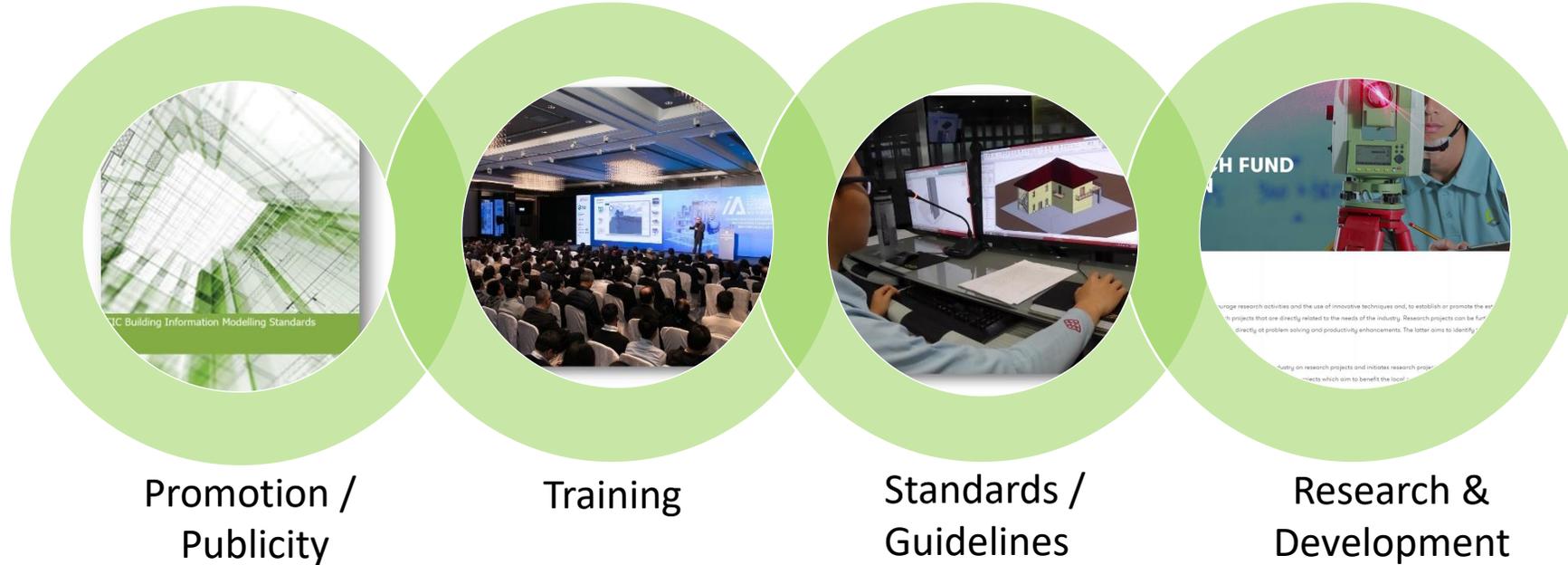
Academia needs help to include BIM in their curriculum.



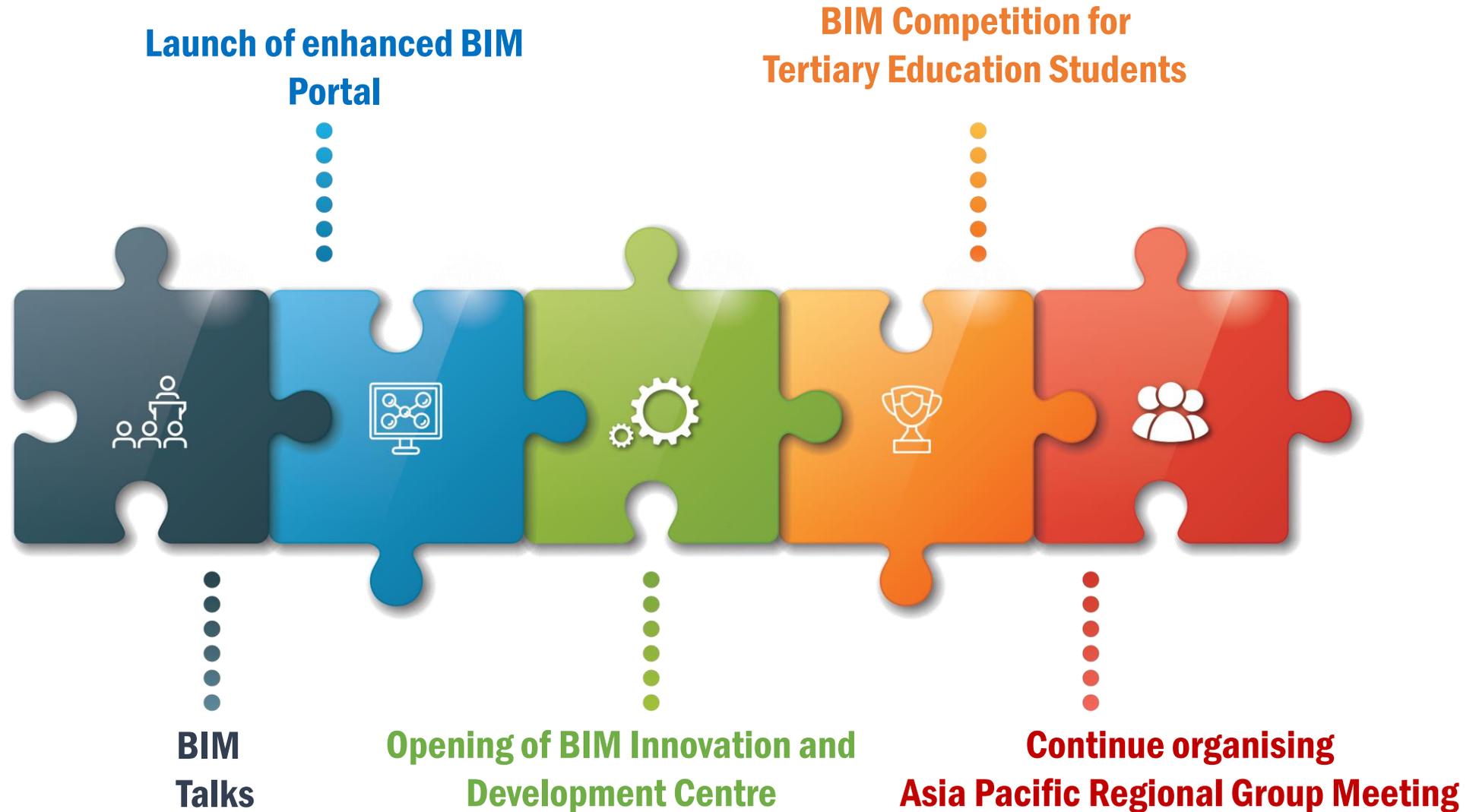
Integration of BIM & GIS



CIC's Support to the Industry



BIM Year 2019



BIM 2030 at a glance

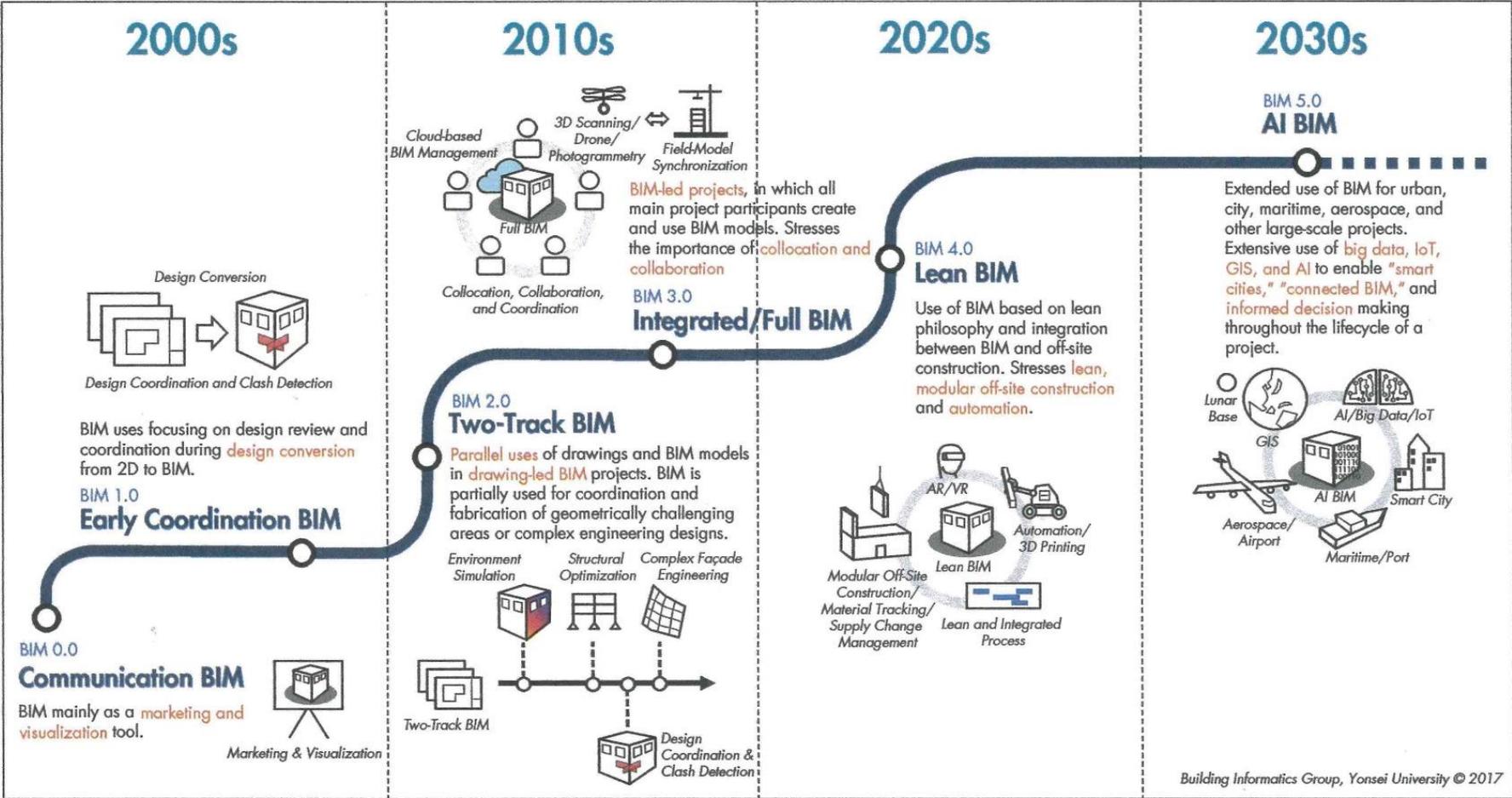
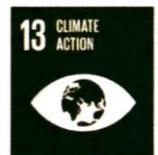
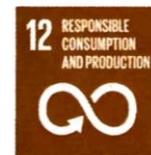


FIGURE 9-8 BIM Progression through the decades.

Graphic courtesy of Building Informatics Group, Yonsei University.



Green Buildings for Everyone, Everywhere

Moving Forward as global citizens, we should act with concerted efforts in the global green building movement, extending our influence with greater impact everywhere, aiming high with more ambitious targets, **strong leadership and authority** in the world.



***The World Needs More Green Buildings!
“We Need Your Contribution in Passive Design!”***



Contact us:

Website: www.worldgbc.org

Twitter: @WorldGBC

Facebook: World Green Building Council

Email: office@worldgbc.org