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Green Management by Stakeholder Empowerment – The Hong Kong Housing Authority Experience

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Organisers:



International Co-owners:





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Deputy Director of Housing (Development & Construction)
To **supervise** the Development & Construction Division of the Housing Department, and **oversee** all facets of public housing development work in Hong Kong



Chairperson of Committee on Building Information Modeling (BIM) and
Chairperson of Committee on Construction Safety, Construction Industry Council (CIC) of Hong Kong



One of the Directors of the Hong Kong Green Building Council (HKGBC)



Organisers:



International Co-owners:



1. Introduction
2. Empowering the Industry
3. Empowering our Staff
4. Empowering our Housing Tenants
5. Concluding Remarks



1. Introduction



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Sustainable Buildings and Climate Initiative
Promoting Policies and Practices for Sustainability



Introduction

Hong Kong Housing Authority (HKHA) implements one of the world's largest public housing programme

Housing Estates in Hong Kong

- Adopt **functional and cost-effective design** in the Planning, Design, Construction and Management of housing projects;
- Promote **healthy living and green environment** in the work;
- Act with **caring and partnering** culture beyond baseline performance.

2,140,000 (30%) population

14,000+ workers daily

99 listed contractors

80+ active suppliers

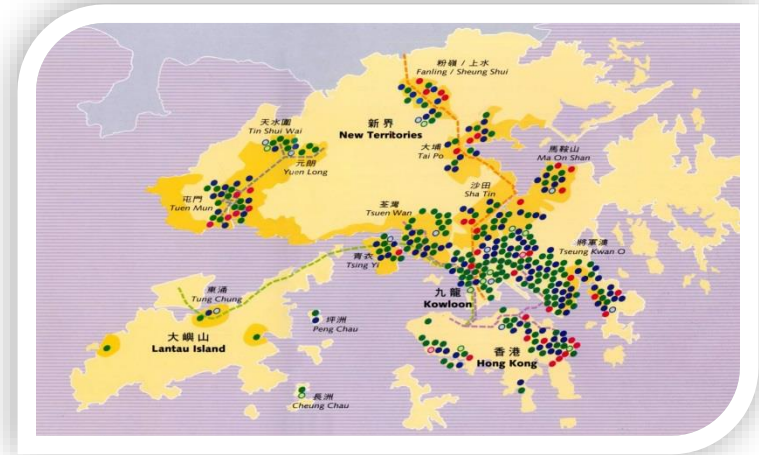
9,000+ HA staff



756,000 flats in use



280,000 new rental & subsidized sale flats from 2017/18 to 2026/27



Organisers:



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2. Empowering the Industry



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2. Empowering the Industry

We partner with our stakeholders in the construction industry, including the contractors, material suppliers, academia and regulators through regular meetings, participation in local/ regional/ international seminars, exhibitions, journals & conferences, to undertake research and development.

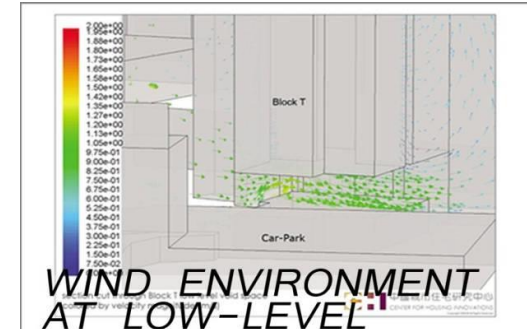


2.1 Micro-climate Studies

- To provide comfortable living environment in sub-tropical climate, we have partnered with **environmental consultants** to apply micro-climate studies in passive design of all new projects since 2004.
- Designers can optimize the use of natural resources such as local wind breezes, natural ventilation, daylight and solar heat gain.
- After July 2006, we have conducted air ventilation assessment to compare different design options and select the optimal solution.



Sun Shadowing Analysis



Wind Permeability

Ventilated corridors with natural daylight
achieve energy saving up to **15%**

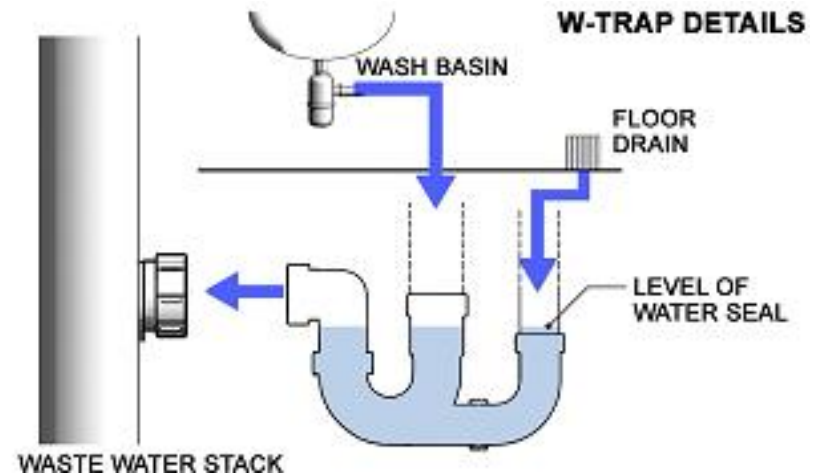


*Vertical
Daylight Factor
/ Indoor
Environment
Quality*

2.2 W-trap Drainage System

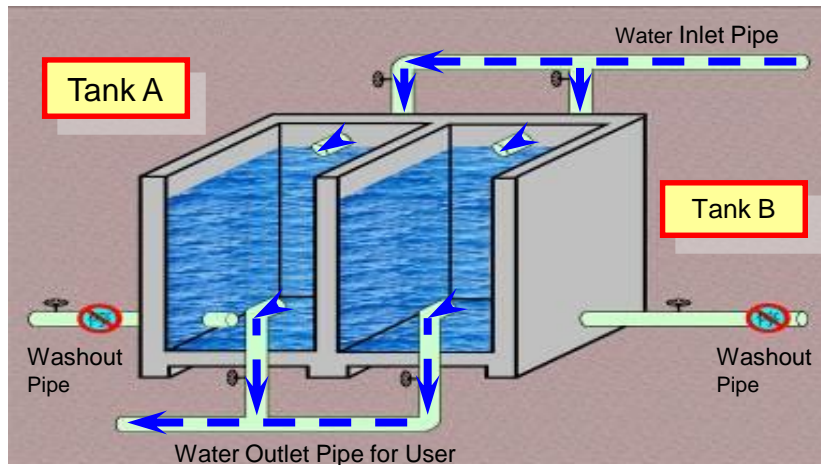
- The outbreak of SARS in March 2003 aroused public concern over the problem of dried up floor traps in the drainage system.
- HKHA in collaboration with **City University of Hong Kong**, and in consultation with **Buildings Department**, conducted the study on the use of Common W-traps in the drainage system in 2004.
- The W-trap system has been used in all new projects since 2005.

2. Empowering the Industry



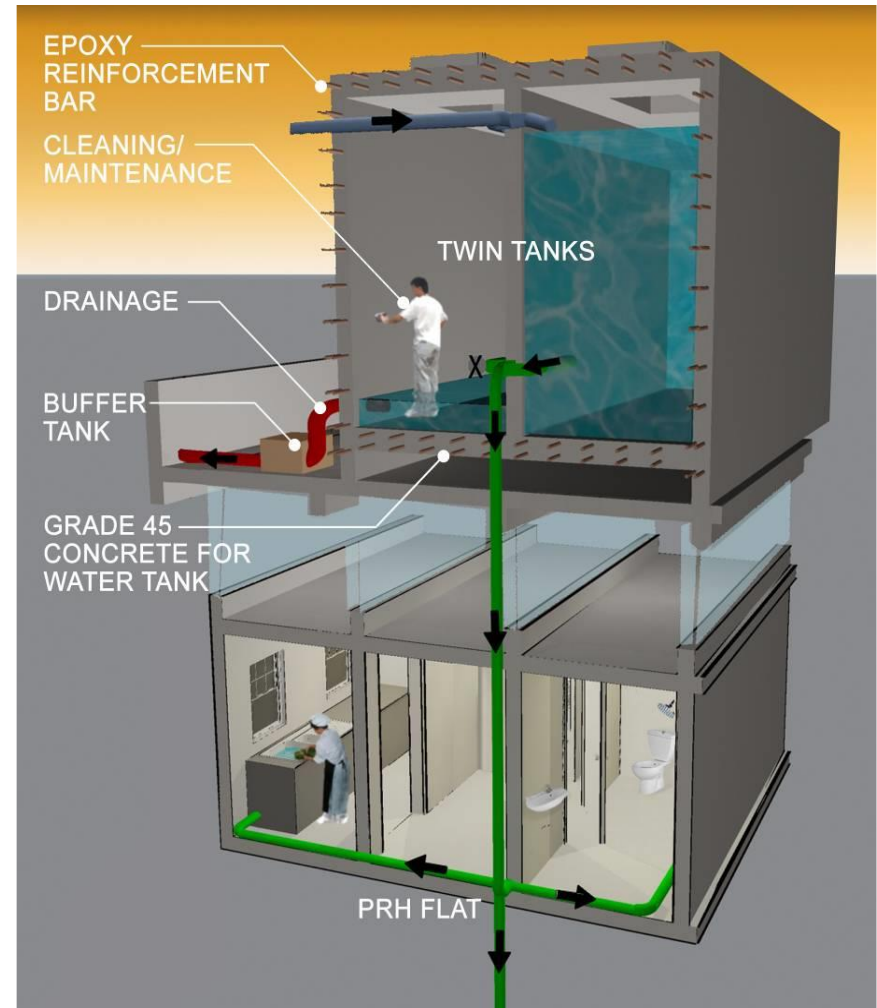
2.3 Twin Tank System

- We want to avoid water supply interruption during cleansing of water tanks.
- We have introduced the innovative “twin tanks system” in consultation with **Water Services Department**, for all new public housing projects since 2008.
- This allows continuous water supply to residents during regular tank cleansing, facilitates maintainability and saves water.



Twin Tank System

2. Empowering the Industry



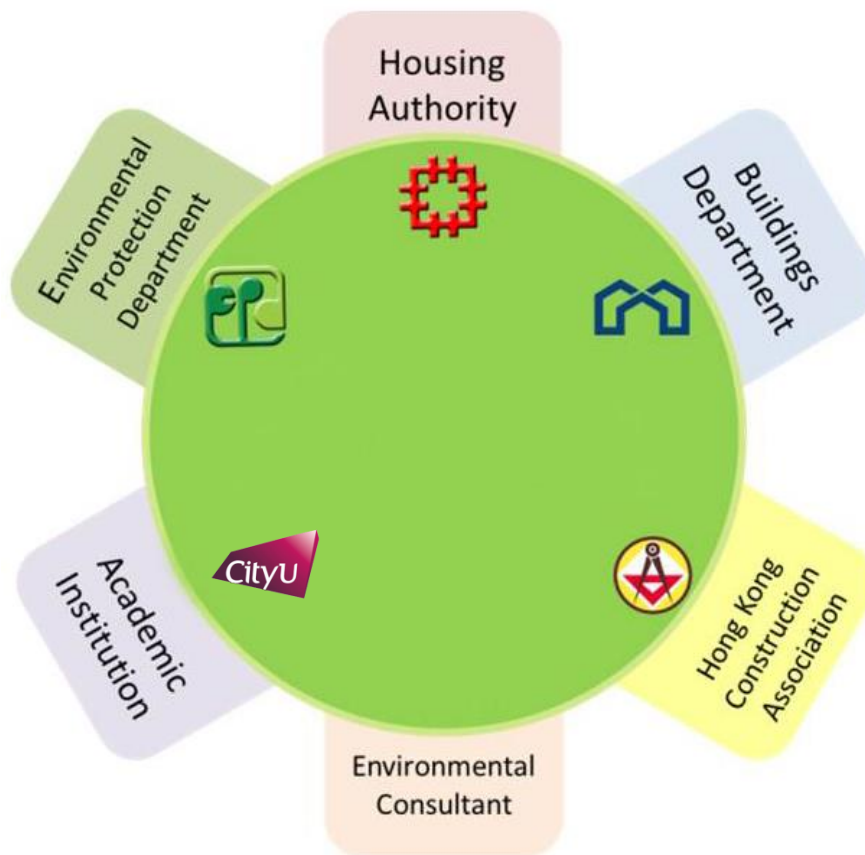
2.4 LED Bulkheads

- To further enhance energy efficiency in lighting, we have tried some types of LED bulkhead lightings in the corridors of typical domestic floors since 2011.
- We conducted a large scale trial installation at the public areas of a domestic block in Kai Tak Site 1A project in 2013.
- Since 2016, we have been adopting LED bulkhead lights for public areas of all new domestic blocks under design.
- We specify the use of products in market certified to the “**Product Certification Scheme for LED Lighting Products**” of the **Hong Kong Electronic Industries Association**.



2. Empowering the Industry

With the support of our stakeholders in the industry, including academia, regulators, consultants, contractors and suppliers, we have been driving innovations in the use of green materials, design and site management tools, and construction systems.



3. Empowering our Staff



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3. Empowering our Staff

*Whenever there is a problem,
that is the time to innovate.*

- We empower our staff to take initiatives in developing innovative ideas to serve the community;
- by means of incentive schemes, awards, and provide necessary resources to assist them.

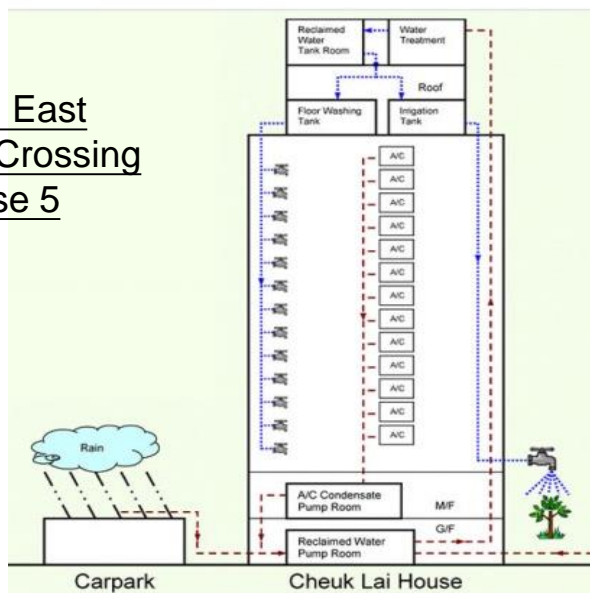
- *ARCHITECTS*
- *BUILDING SERVICES ENGINEERS*
- *CIVIL ENGINEERS*
- *GEOTECHNICAL ENGINEERS*
- *LAND SURVEYORS*
- *LANDSCAPE ARCHITECTS*
- *PLANNING OFFICERS*
- *QUANTITY SURVEYORS*
- *STRUCTURAL ENGINEERS*



3.1 Rainwater Harvesting/Root Zone Irrigation

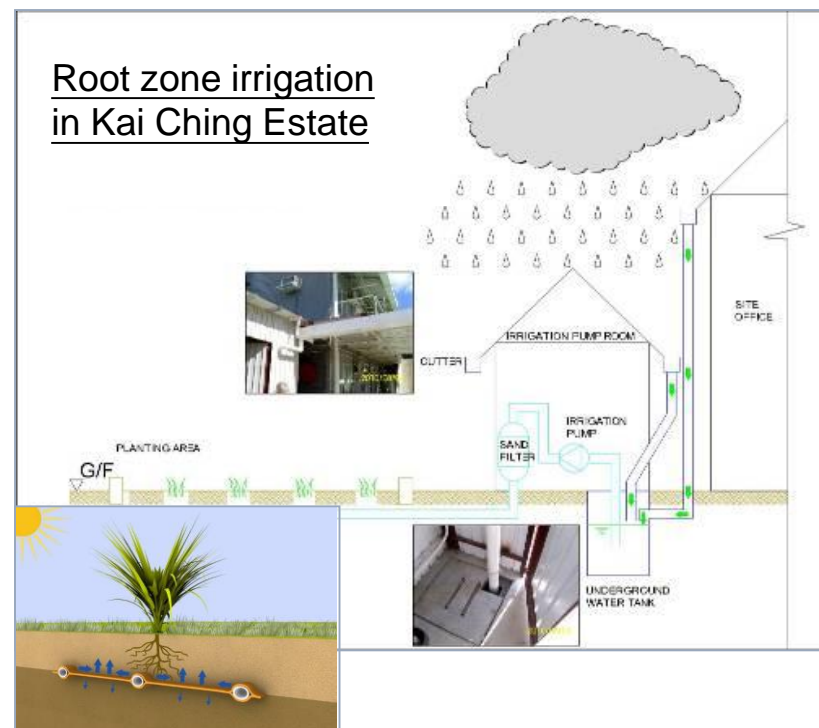
- To harvest rainwater for irrigation to reduce water consumption, we conducted studies on Rainwater Harvesting Systems (RWHS).
- Two pilot RWHS were devised in 2011 and 2012.

RWHS in East Harbour Crossing Site Phase 5



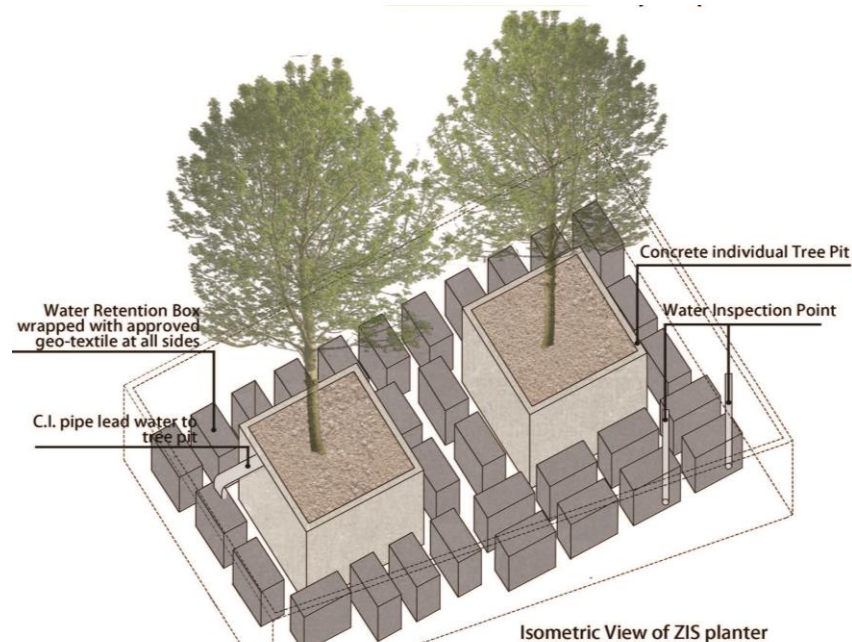
3. Empowering our Staff

- A root zone irrigation system was tried out in Kai Ching Estate in 2010, with polyethylene dripping tubes wrapped with specially designed fleece below soil surface.
- It achieved water saving of 38%.



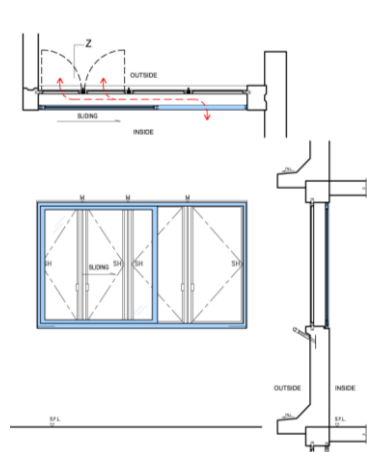
3.1 Zero Irrigation System (ZIS)

- We further devised ZIS: a sub-irrigation system comprising a wicking mechanism which is a self-sustained and passive design to deliver storm water stored in sub-soil retention box to the vegetation and minimize topsoil evaporation through capillary action.
- This system is more efficient in water conservation and less mechanical part for maintenance when compared with RWHS.
- After successful trials in 2 sites in 2016, ZIS will be implemented for selected planters in all new projects.



3.2 Acoustic Window and Acoustic Balcony

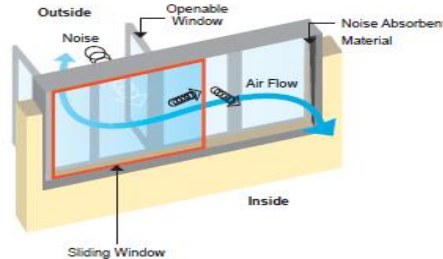
- Hong Kong is renowned for its high density living environment, with heavily trafficked roads or other noise sources in close proximity.
- To tackle the traffic noise without compromising natural ventilation for the flats, we have come up with the innovative acoustic windows and acoustic balcony design.



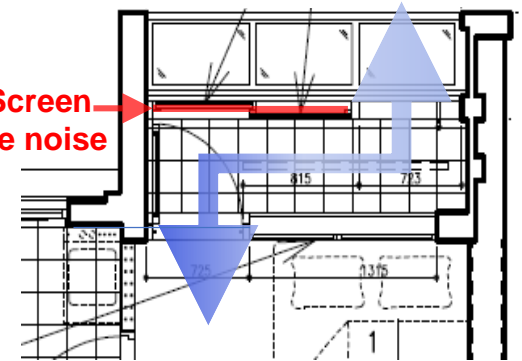
Acoustic Window (-6.4dBA)



1st Generation Acoustic Balcony
(-8dBA)



Sliding Screen
to mitigate noise



2nd Generation Acoustic Balcony
(-10dBA)



3.3 Precasting and Prefabrication

- To enhance quality of buildings and saving of labour on site, we have pioneered the use of precasting techniques in HA's domestic blocks construction since 1980s.
- These include precast façade, precast staircase, volumetric precast bathrooms/kitchen, semi-precast slab, precast manhole.



Less construction
Waste on site

Less material wastage

Reduce environment
impact

Enhanced building
quality

Enhanced site safety

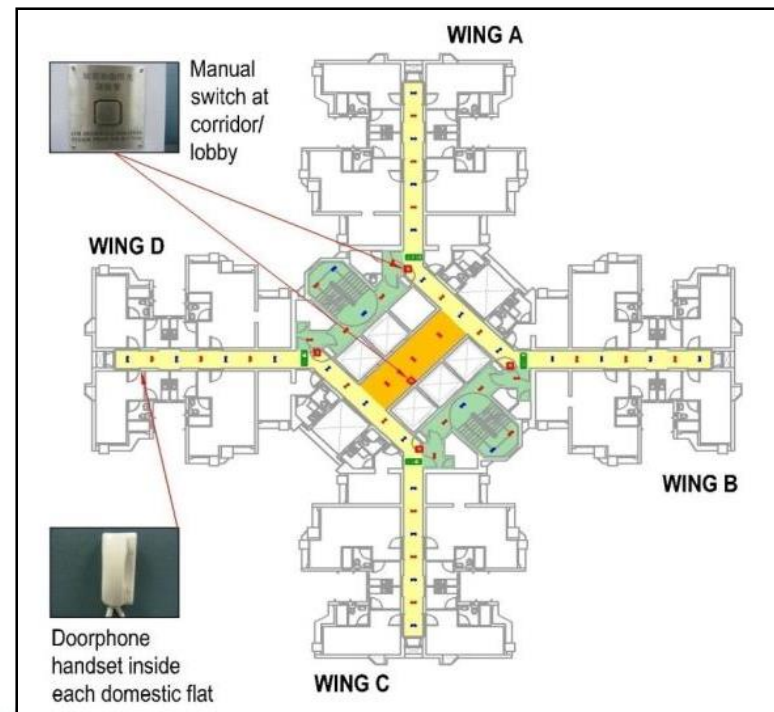
Better maintainability

Cleaner site environment



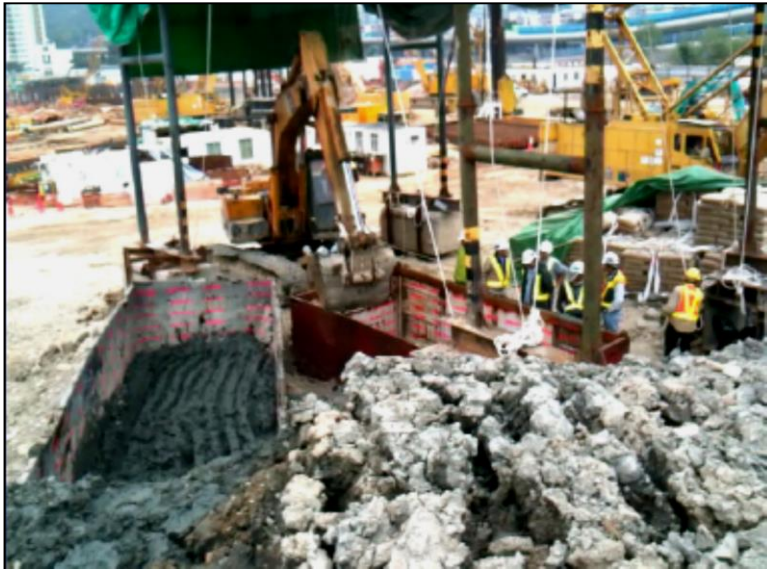
3.4 Two-level Lighting System

- To strike a balance between energy conservation and adequate illumination, we designed a two-level lighting control system for public area of domestic buildings.
- Illumination level is maintained normally at 50 lux at lift lobbies and 30 lux at corridors and staircases around the clock, while the illumination level can be elevated to 85 lux, zone by zone, for a pre-set period of time once triggered by users on a need basis.
- The energy consumption of the lighting installation can be saved by approximately 30%.



3.5 Recycling and Re-use Marine Mud

- The disposal of large volumes of marine mud in landfill sites or marine dumping facilities is costly, time consuming and burdensome to the natural environment.
- We have developed an innovative and inexpensive engineering method to recycle the materials, through mixing with a certain proportion of cement and granular materials, to strengthen, stiffen, and stabilise the mud. The recycled mud can be used for backfilling and eco-paver blocks.



Excavation of marine mud



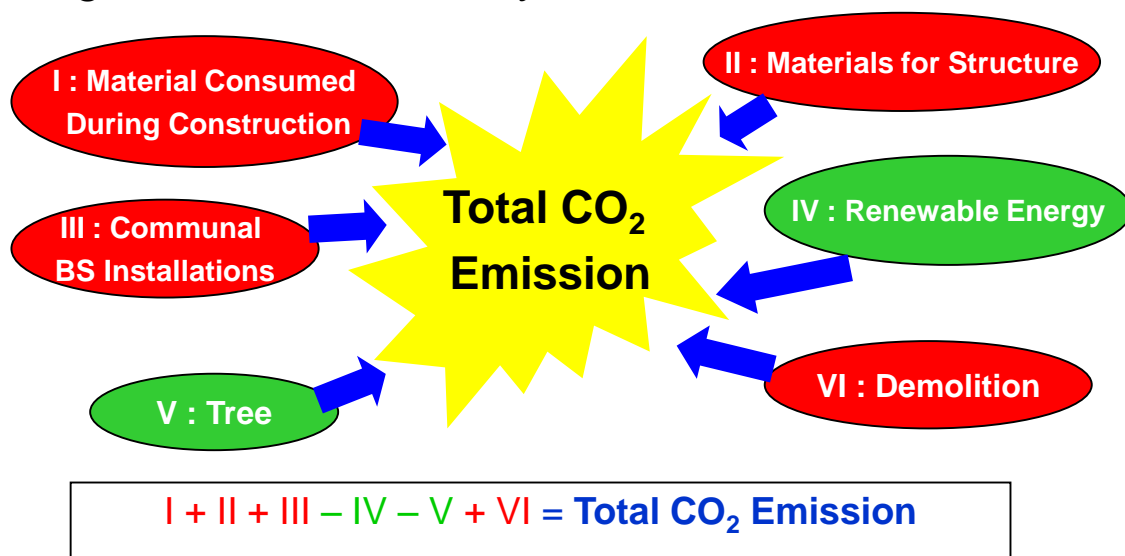
Mixing with cement and granular material



Backfilling with stabilised marine mud

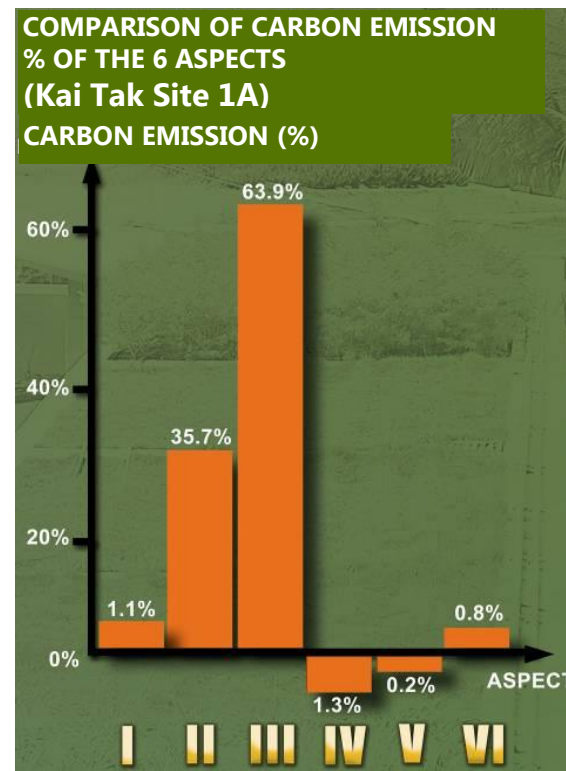
3.6 Carbon Emission Estimation (CEE)

- Since 2011, we have conducted CEE for all domestic blocks of new public housing developments.
- We achieved an estimated reduction in carbon emission of around 980,000 tonnes for the whole life cycle of these domestic blocks.
- It represents an average of 13% reduction as compared with the baseline figure of New Harmony 1 block.

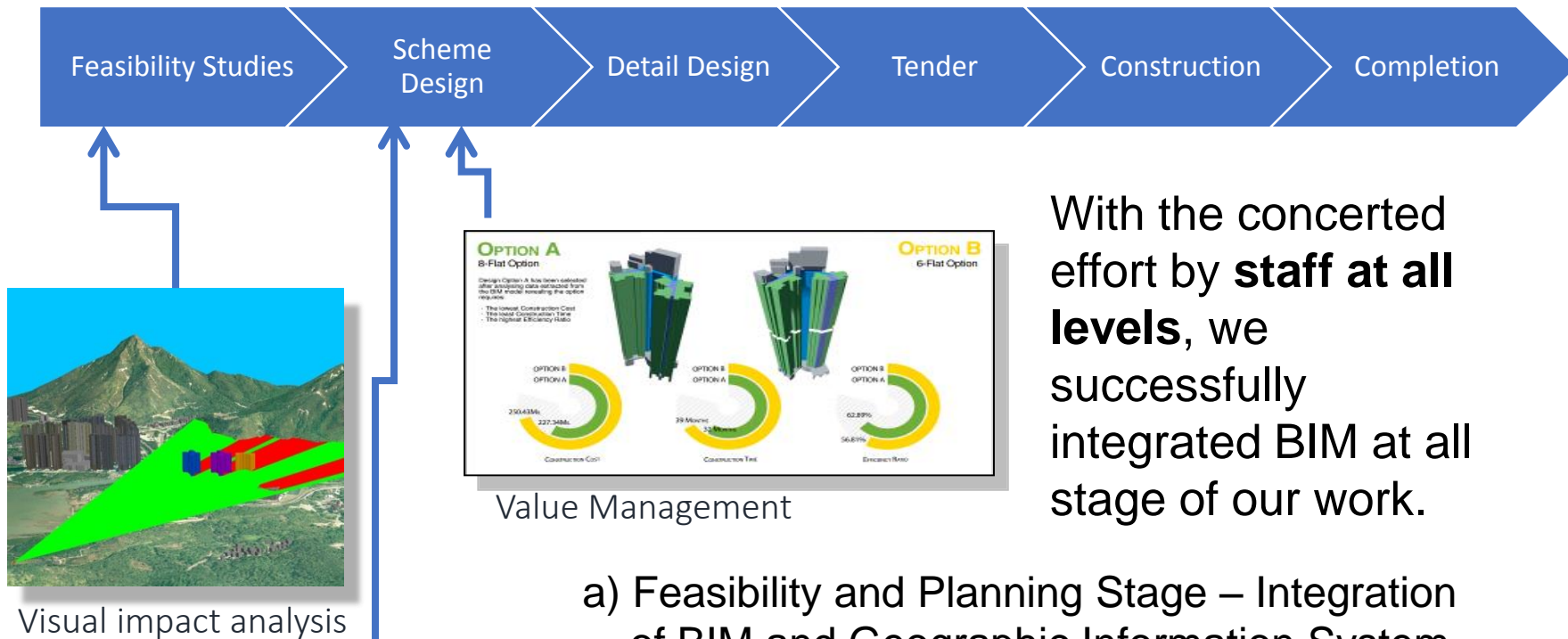


Aspect III on Communal BS Installation is significant.

Important to promote low carbon living to tenants after occupation of buildings.



3.7 Building Information Modelling (BIM)



With the concerted effort by **staff at all levels**, we successfully integrated BIM at all stage of our work.

- Feasibility and Planning Stage – Integration of BIM and Geographic Information System (GIS) for visual impact assessments, ridge line, vantage point and shadow analyses.
- Scheme Design Stage - for Site Specific Design and Value Management.



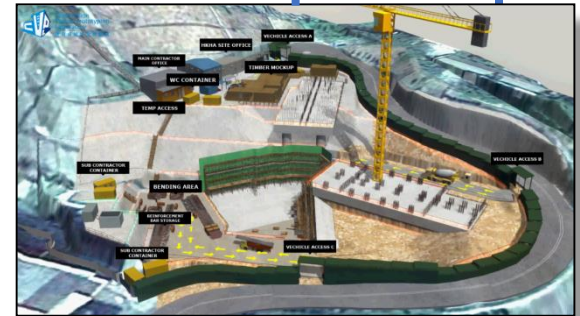
3.7 Building Information Modelling (BIM)



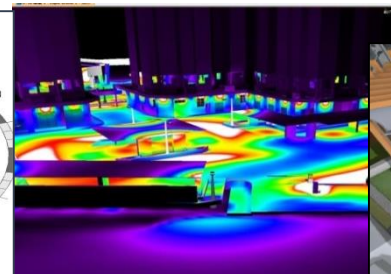
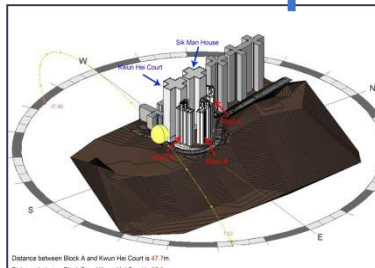
c) Detail Design Stage – Integrated use of BIM and environmental analysis software to achieve energy saving.

d) Construction Stage - for site safety and construction planning.

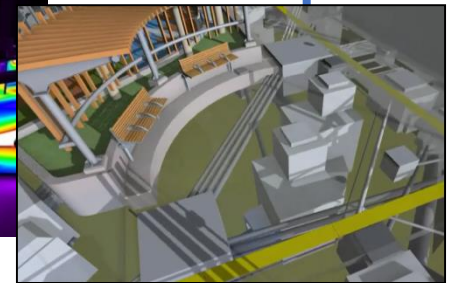
e) Post Completion Stage – for Facilities and Asset Management.



Construction & safety planning



Performance analyses



Facility Management



4. Empowering our Housing Tenants



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4. Empowering our Housing Tenants

- **Housing tenants** are another important stakeholder of HKHA. We empower them to upkeep the premises.
- We partner with the **tenants' association**, the **Estate Management Advisory Committee (EMAC)**, as well as local Non-governmental Organisations (NGO), schools, to organise green activities engaging estate tenants.



4. Empowering our Housing Tenants

4.1 Green Delight in Estates

- Since 2005, we have partnered with green groups for the "Green Delight in Estates" programme.
- We organised estate-wide campaigns for all PRH estates, and in-depth educational and promotional programmes for about 30 selected PRH estates each year which focused on special themes and activities.
- These are well received by the estate tenants, EMAC, local schools and NGO.



4. Empowering our Housing Tenants

4.2 Waste Separation and Recovery

- We have been implementing Source Separation of Domestic Waste Programme.
- We have established recyclables collection points in all PRH estates.
- Used clothes, waste paper, metals, plastics, glass, hazardous material (rechargeable batteries, fluorescent tubes) are collected.



Conventional type of waste separation

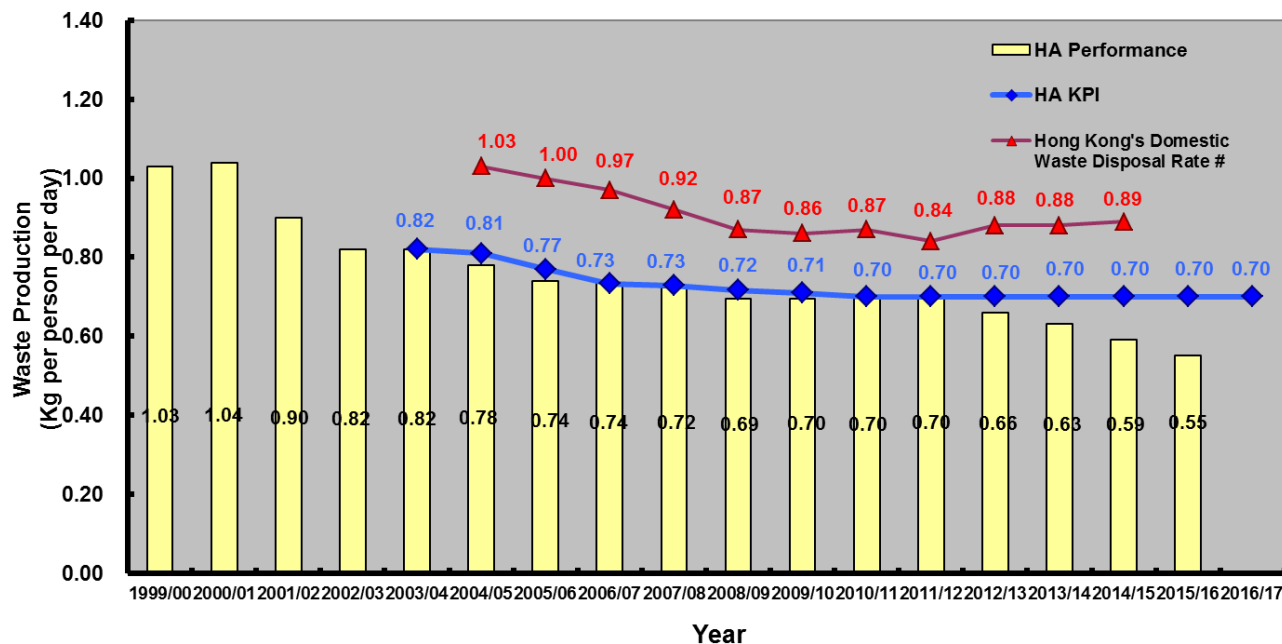


Mail-box type of waste separation

4. Empowering our Housing Tenants

4.3 “Let’s Join Hands to Reduce Waste in Our Estates” Campaign

- We engage our tenants to encourage reduction of municipal solid waste.
- We engage NGOs and other government departments in organising environmental activities.
- **Our residents generate 30% less domestic waste than HK average.**



Source : Environmental Protection Department (2015). *Monitoring of Solid Waste in Hong Kong - Waste Statistics for 2014*.

5. Concluding Remarks



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5. Concluding Remarks

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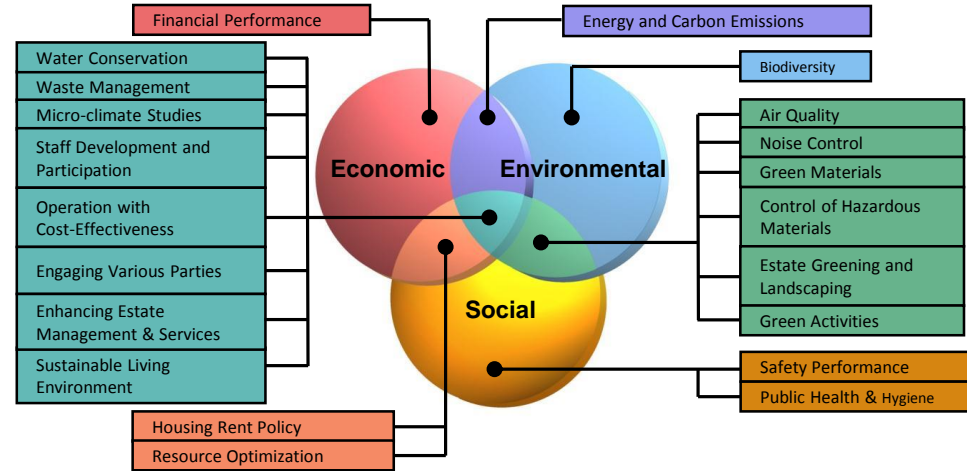
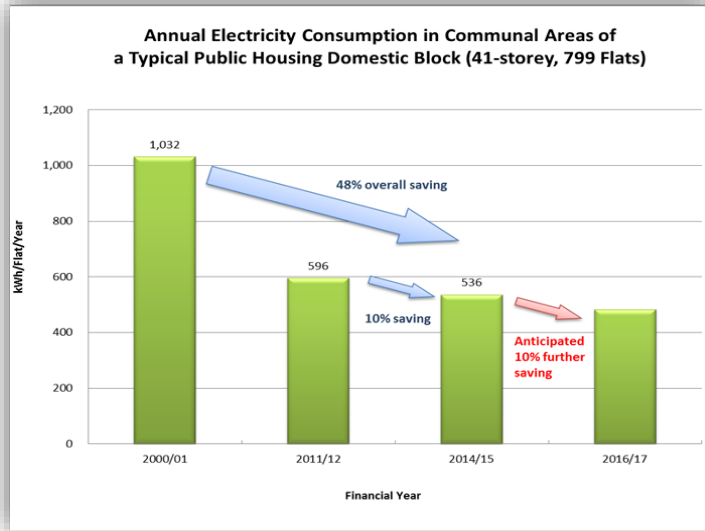
Our Core Values: Caring, Customer-focused, Creative, Committed

We Care

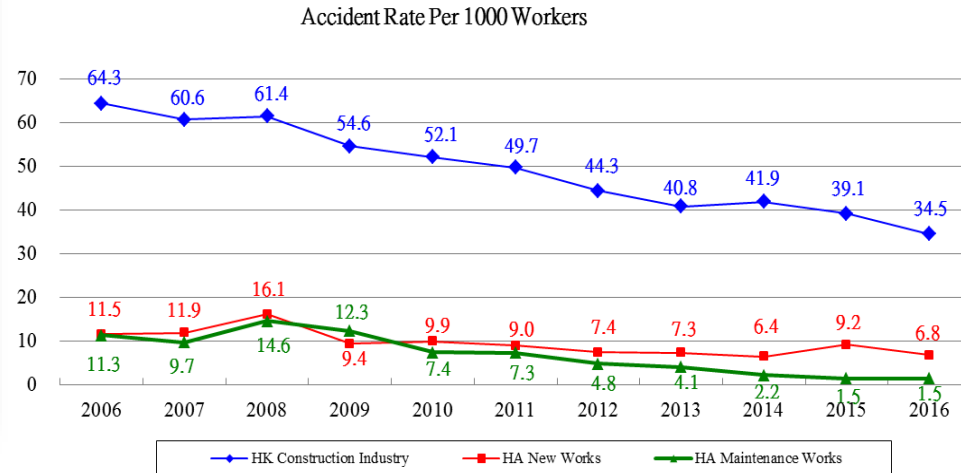
- We care for the **environment**
- We care for the **people**:
- Together we build a **sustainable and harmonious community**

Key Performance Indices

- **34% less costly** than private sector
- **30% less construction waste**
- **48% saving** in annual electricity consumption



Accident rate in HA's sites is reduced, down to 6.8 per 1000 workers in 2016, lower than HK average.



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

International Co-owners:

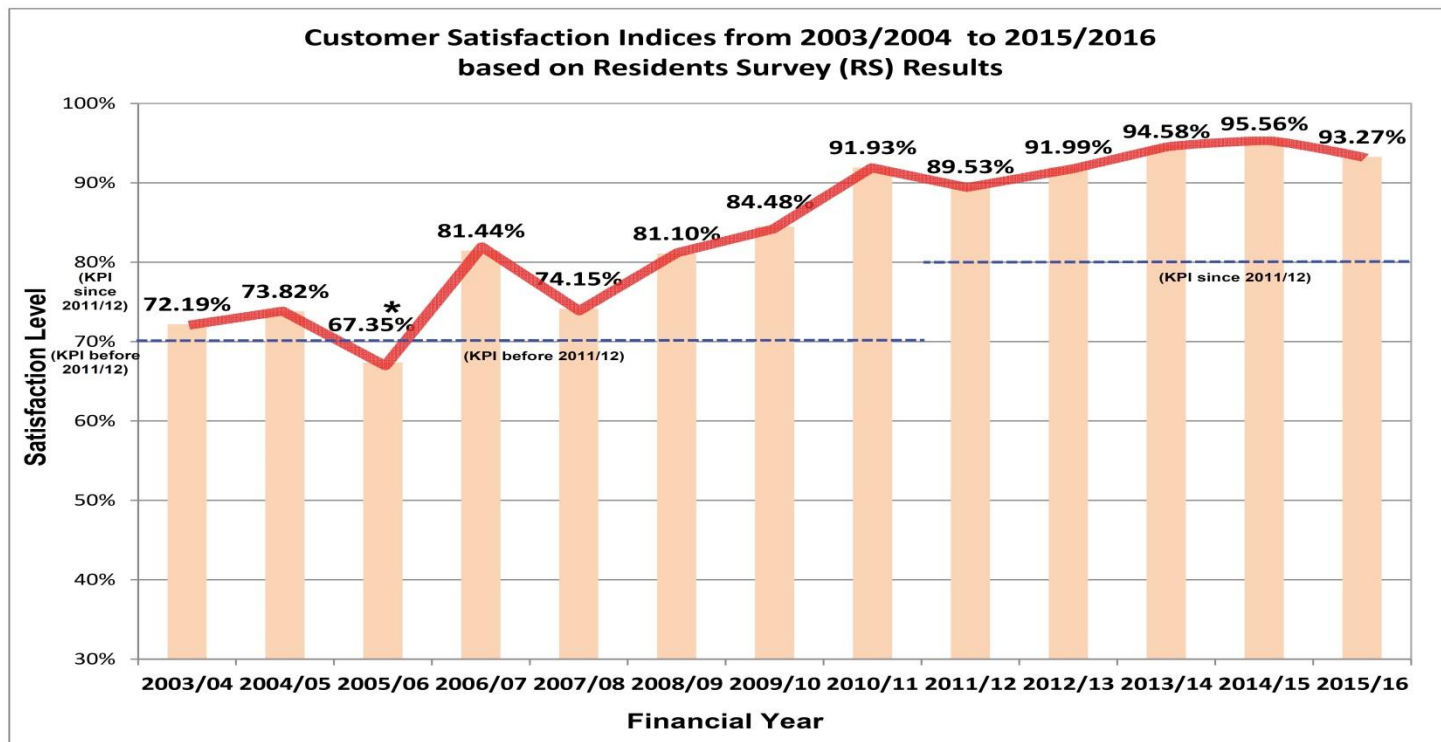


Organisers:



5. Concluding Remarks

- With engagement of the residents in the planning and design of our estates, the Customer Satisfaction Index for our newly occupied projects is continuously maintained above 90% in the past 4 years.
- Empowering the community to work in synergy with us is the key to its success.



Thank you

For details of Hong Kong Housing Authority's Sustainability Initiatives, please visit –

English Version

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

Putonghua Version

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

Cantonese Version

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



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