

Legislative Council Panel on Housing

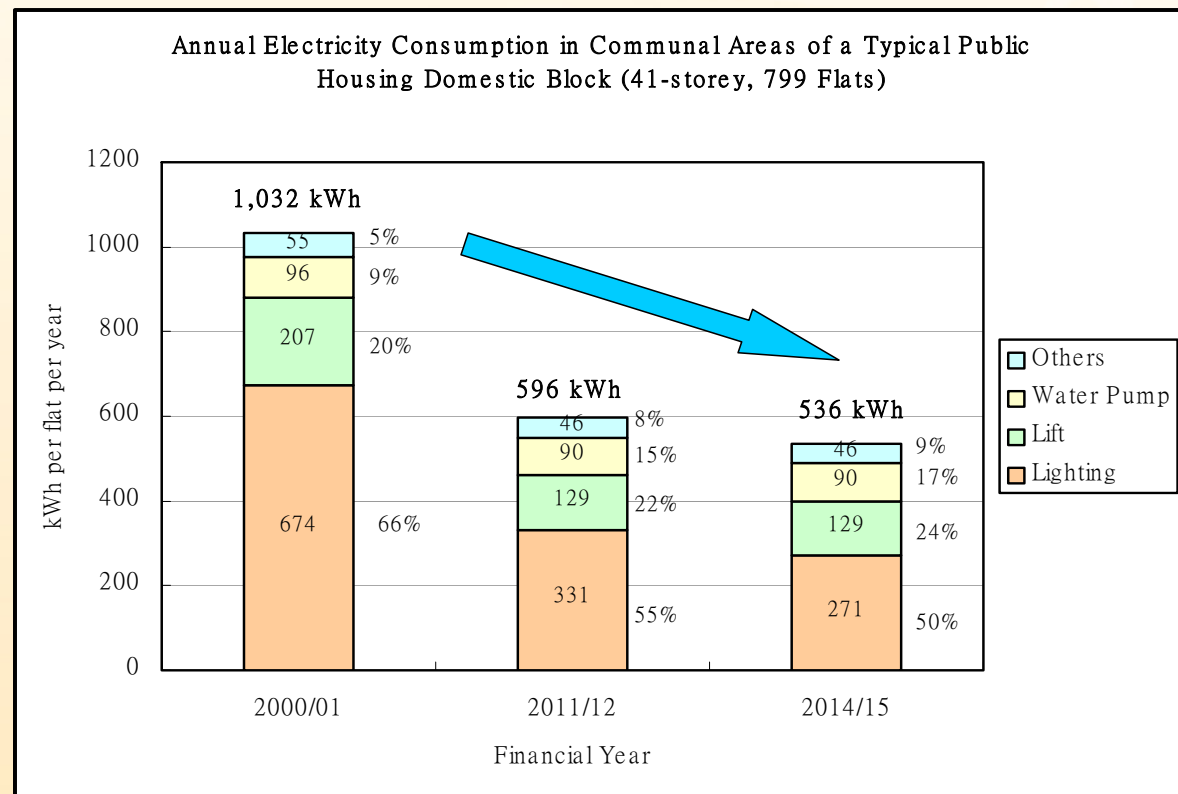
Energy Saving Initiatives in New Public Housing Developments

8 February 2013



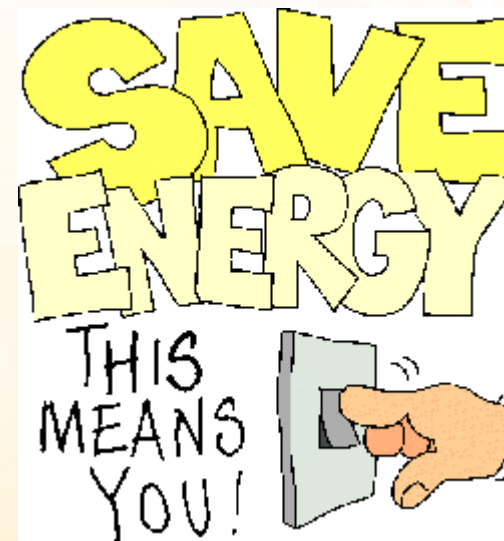
Background

- The HA is committed to implement energy saving measures to reduce electricity consumption in new PHD .
- The HA has achieved a substantial **reduction** in annual electricity consumption in communal areas within new PHD, by **42%** (or 436 kWh per flat) over the past 11 years **from 2000/01 to 2011/12**.
- We will continue to implement more energy saving initiatives with a view to further reduce annual electricity consumption in communal areas by another **10%** in **2014/15**.



Energy Saving Initiatives Being Implemented

- Lighting, lift and water pump systems consume around 55%, 21% and 16% respectively of the energy used in communal areas of a public housing domestic block.
- We have implemented a number of initiatives on **energy saving systems** and effective **energy management tools** to achieve better energy saving performance in new PHD .
- We have also put great emphasis on raising **residents' awareness of energy saving** .



Reducing Consumption by means of Renewable Resources

- In **May 2011**, we implemented **grid-connected photovoltaic system** in all new PHD under planning and design, which provide domestic blocks with communal electricity consumption of at least **1.5%**.
- The system can exploit inexhaustible solar energy and generate electricity without carbon emission.





Reducing Consumption of Lighting Systems

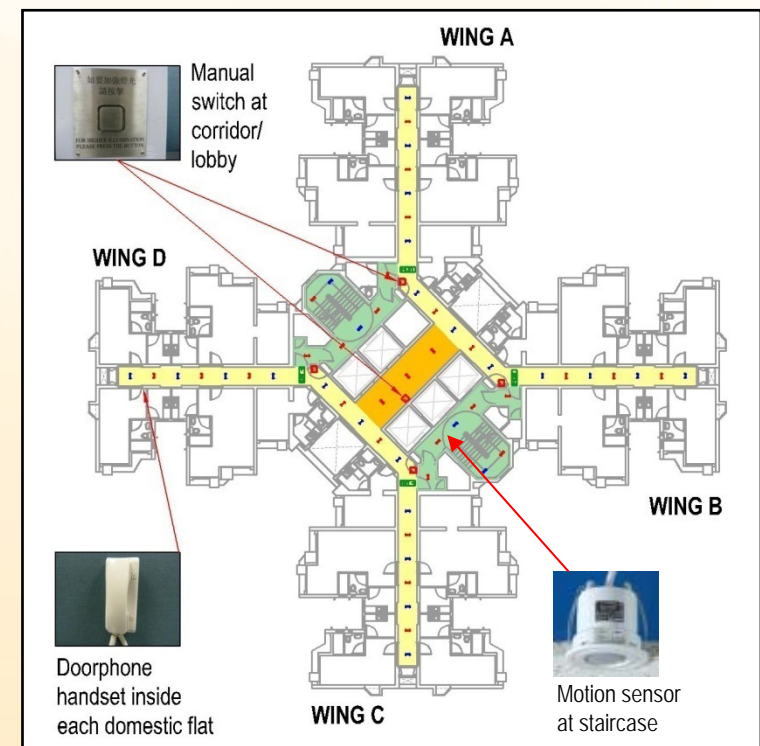
- Lighting systems are the most electricity consuming system in domestic blocks. We have optimized the illumination levels in public areas and also adopted energy efficient **electronic ballasts** and **T-5 fluorescent tubes** since 2000.
- We adopt **passive design** in buildings to optimize the use of daylight and reduce lighting energy consumption. We design lighting circuits to fully utilize **daylight** at open corridors or corridors with openings to maximize energy saving.
- We have widely employed **photo sensors** and **time switches** to fully utilize daylight and control the operation of artificial lights to suit the sunrise and sunset periods throughout the year.





Reducing Consumption of Lighting Systems

- Since **December 2008**, we have implemented a **two-level lighting control system** in new PHD.
- The new “Design Manual: Barrier Free Access (BFA) 2008” promulgated by the Buildings Department in 2008 mandates a higher illumination standard to cater for the needs of the visually impaired persons.
- In order to **save energy and at the same time comply with the BFA requirement**, we have, under the lighting-on-demand principle, developed a two-level lighting control system for lift lobbies, corridors and staircases in domestic blocks, whereby light levels are controlled by means of **motion sensors** and **on-demand switches with timer controls**.





Reducing Consumption of Lift Installations

- Since 1996, we have used **variable voltage variable frequency (VVVF)** type lift power system .
- This energy-efficient system ensures that our lift installations meet the Building Energy Code (Lift) under the Voluntary Energy Efficiency Registration Scheme for Buildings .
- In addition, we have adopted a light weight lift car decoration design to further save energy.





Reducing Consumption of Water Pump Installations

- Since 2010, we have adopted **electronic variable speed drive control systems** in the fresh water booster pump system to provide adequate water pressure to the topmost domestic floors .
- **High efficiency motors** are also used to further reduce the energy consumption of water pump installations.





Energy Efficiency Registration Scheme for Buildings

- Since 2000, the HA has been one of the forerunners in adopting the **non-statutory Building Energy Codes (BEC)** under the voluntary Energy Efficiency Registration Scheme for Buildings (EERSB) in the design of new PHD.
- Up to December 2012, more than 400 Building Energy Certificates have been awarded by the Electrical & Mechanical Services Department (EMSD) for new PHD in recognition of their building energy performance .





Carbon Emission Estimation

- Since February 2011, we have conducted carbon emission estimations for all domestic blocks of the new PHD.
- We have developed a user-friendly carbon emission estimation (CEE) methodology to holistically evaluate the carbon emission of our new PHD throughout the building life cycle .
- The CEE model embraces the carbon emission from major construction materials and building operations as well as the carbon reduction from renewable energy systems and absorption from trees planting.



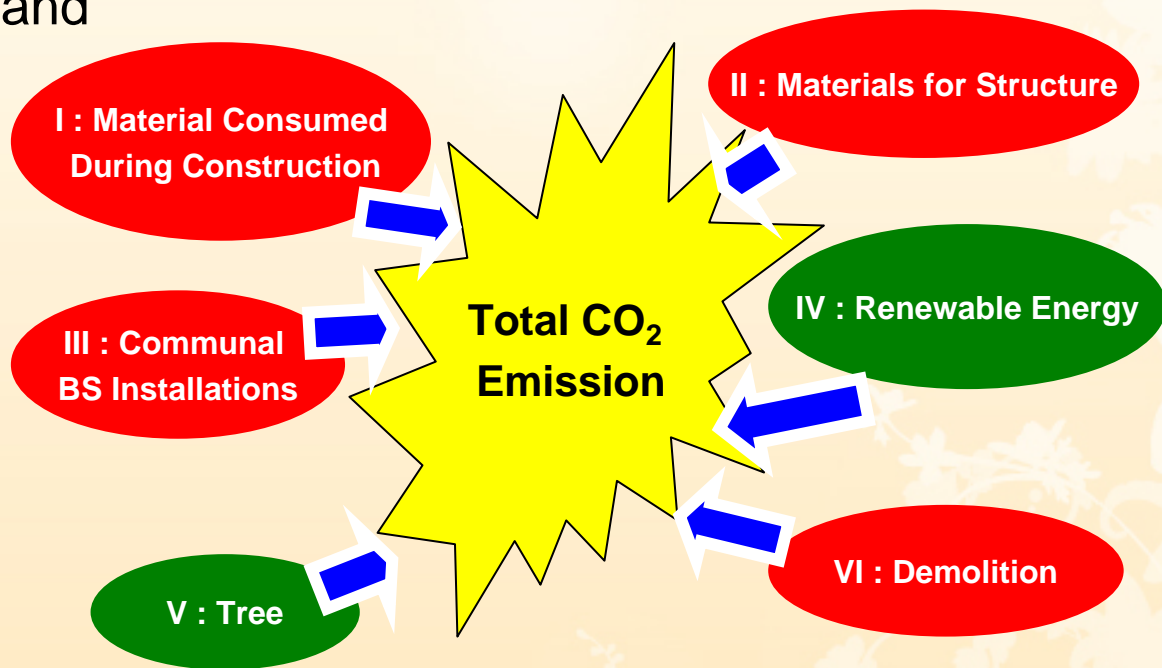
Carbon Emission

Carbon Reduction
& Absorption



Carbon Emission Estimation

- It consists of six aspects, namely
 - (I) materials consumed during construction,
 - (II) materials for building structure,
 - (III) communal building services installations,
 - (IV) renewable energy,
 - (V) trees planting, and
 - (VI) demolition.





Carbon Emission Estimation

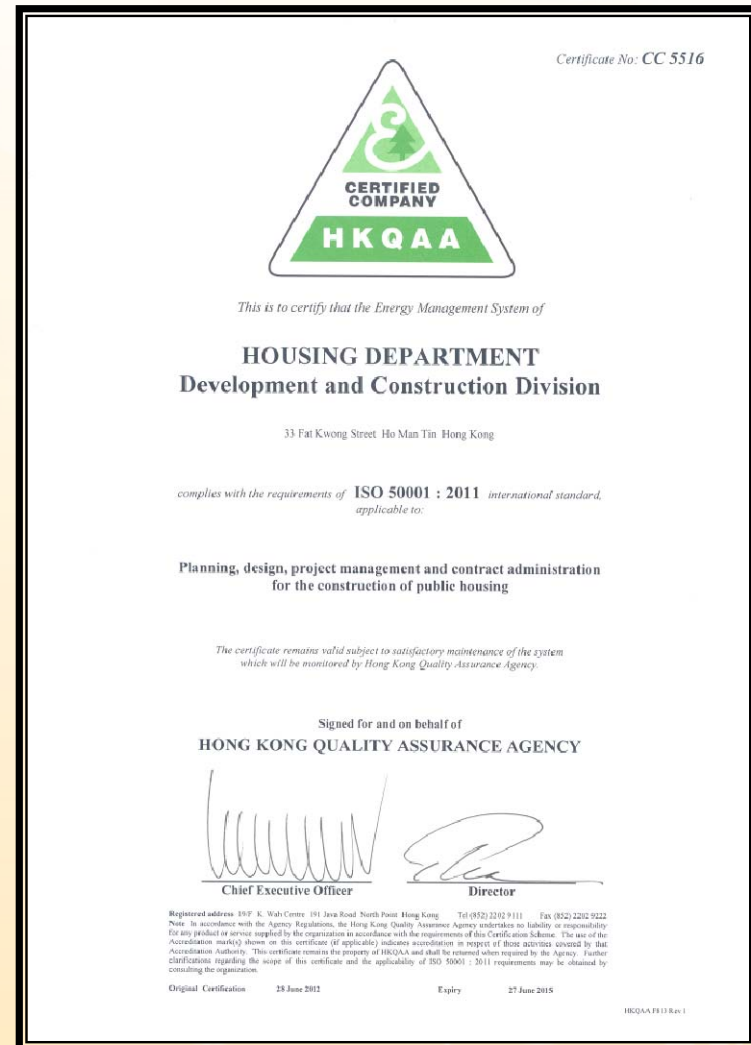
- This provides an effective design verification tool for us to gauge the overall performance of a PHD in terms of carbon emission throughout the life cycle of the buildings.
- In most cases, **aspects (ii) and (iii)** contribute to **more than 30% and 60%** of total carbon emission.





Energy Management System to ISO 50001

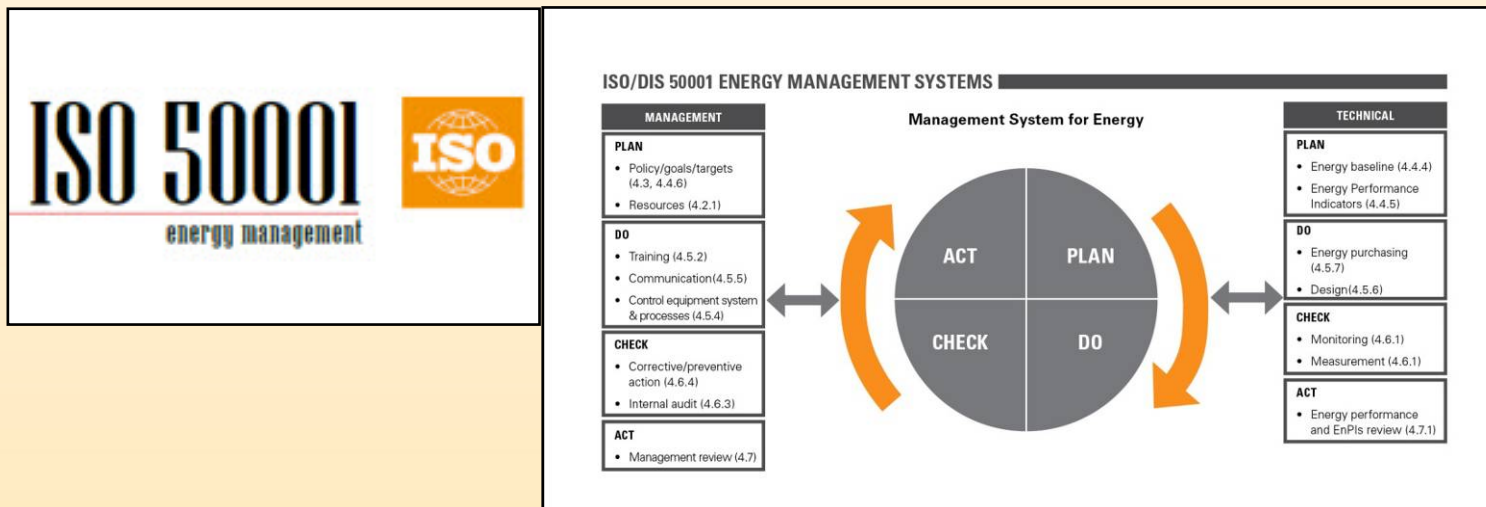
- With the launching of ISO 50001 in June 2011, we developed and rolled out HA's Energy Management System (EnMS) for new PHD in December 2011 by modeling on the ISO 50001 best practice framework.
- HA was awarded the **first ISO 50001 certificate** on residential building design in **Hong Kong** in **June 2012**.





Energy Management System to ISO 50001

- The ISO 50001 EnMS provides a **systematic framework** to verify the energy performance of **communal building services installations design** of residential buildings against the energy baseline.
- It also set a clear indicator for improving the energy performance of our design .
- The energy performance will be verified by **actual energy measurements** taken after the mass intake of the domestic blocks .



Awareness of Energy Saving

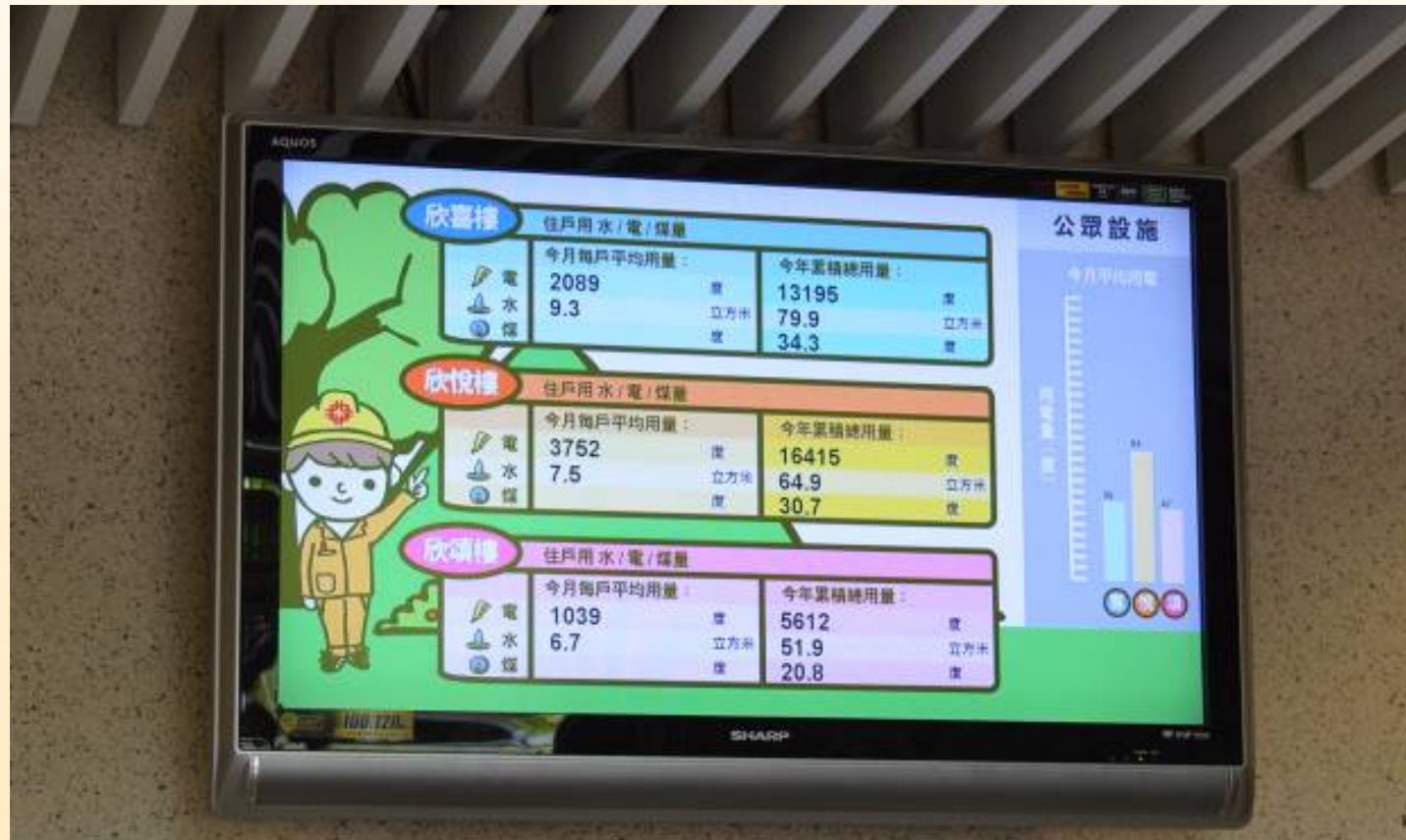


- To raise tenants' awareness of energy saving, we have installed one or more **solar-powered lamp poles** at prominent locations in each new PHD **since 2008** for educational purpose.



Awareness of Energy Saving

- We also installed pilot **smart meters** and **display panels** in ground floor lobbies in Yan On Estate at Ma On Shan Area 86B to make tenants aware of the comparative electricity, gas and water consumptions in each flat, so as to encourage the reduction of energy consumption of sitting tenants .





Way Forward

- Although the electricity consumption has already been substantially reduced through the implementation of energy saving initiatives, we will continue our efforts in exploring every practicable means to further enhance the energy performance of our buildings .
- We target to **save a further 10%** of electricity consumption in communal areas by adopting **light emitting diode (LED) bulkheads** .
- LED lighting is a promising technology that can be utilized to further reduce the energy consumption in new PHD with its potential merits of better luminous efficacy (better lighting output per watt than conventional compact fluorescent lamp by about **30%**) .





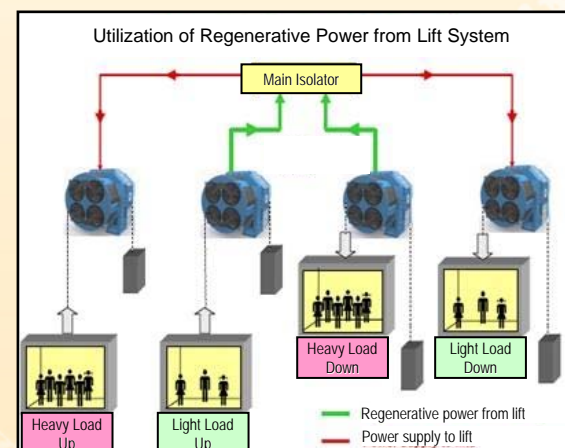
Way Forward

- To reap the benefits of the new technology, we are testing **eight LED prototypes** in **Tsz Ching Estate** and implementing a trial installation of **LED bulkheads** in **Kai Tak Site 1A** to evaluate the performance and product reliability.
- The prototypes in Tsz Ching Estate are under continuous monitoring; we will also start monitoring the trial installation in Kai Tak Site 1A upon the completion of construction in 2013 .
- When the LED bulkheads are proven to be reliable and the price becomes more cost-effective, we will consider wider applications of LED bulkheads in new PHD .



Way Forward

- As lift systems are recognized as the second-most electricity consuming system for communal areas, we will also explore the potential of new lift technologies to save energy from lift systems, such as the **Permanent Magnet Synchronous (PMS) lift motor**, as well as the **lift regenerative power systems**.
- The **PMS lift motor** is a new technology that can drive lift machine with energy saving potential.
- In addition, **regenerative power collected from lift system** can be utilized for communal consumption.
- We are currently carrying out trial installations of PMS lift motors in **Kai Tak Site 1A** and lift regenerative power systems in **Kai Tak Site 1B**, both are due for completion in 2013.
- We will monitor the availability of suppliers with a view to considering wider use of the two new lift technologies mentioned above.



Thank You