

# Environmental Performance

● Initiatives in Planning and Construction of New Housing Estates

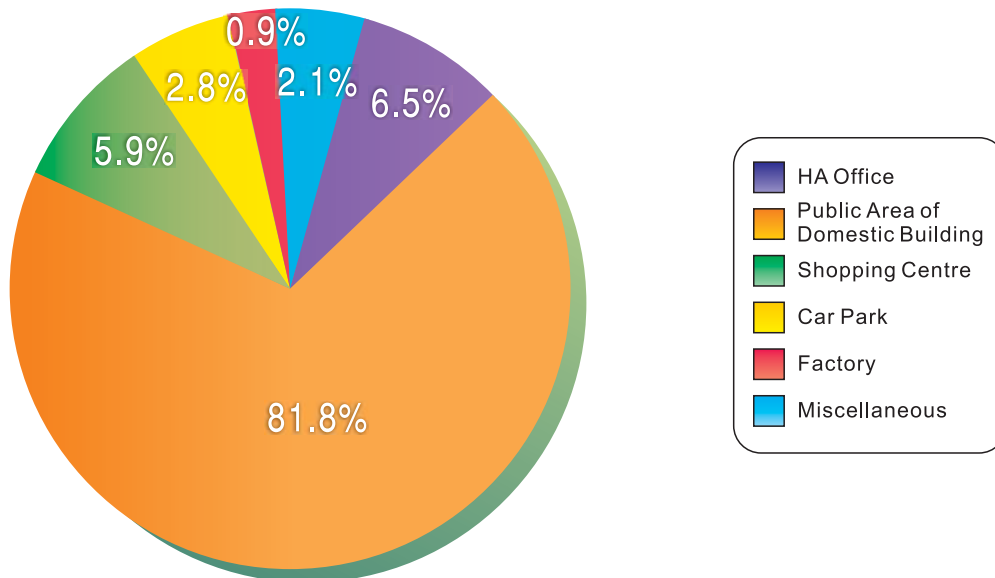
● Initiatives in Existing Housing Estates

● Initiatives in Office at Work

We strive for environmental excellence across our operations through the adoption of various green initiatives. We have introduced and practised different environment-friendly measures in our daily operations. These include green construction, energy saving, resources conservation, waste reduction, landscape improvement as well as fostering a greener mindset and lifestyle among our tenants.

In 2010/11, electricity consumption for PRH blocks, offices and other premises was 578 194 396 kWh, a reduction of 2.65% from the electricity consumed in 2009/10. This accounts for a reduction of 11 008 tonnes of carbon dioxide equivalent (CO<sub>2</sub>-e)<sup>1</sup> and monetary savings of over HK\$15.7 million<sup>2</sup> in last year.

**Distribution of Electricity Consumption in 2010/11**



During the year, we complied with all applicable environmental legislation except for one conviction case in environmental offence regarding our contractors' operation, which is related to non-compliance with the Construction Dust Regulation.

1 A default value for the emission factor of 0.7kg/kWh is employed to account for Greenhouse Gas (GHG) emissions associated with the generation of electricity for customers in Hong Kong.

2 A default value of HK\$1 is used to account for the charge of 1 kWh electricity consumed.

Our efforts have been well recognised by the community. In 2010/11, we were awarded the “Class of Excellence” Wastewi\$e Label of the Hong Kong Awards for Environmental Excellence for the third consecutive year. In recognition of our long-term commitment to waste reduction, we were further awarded the “Wastewi\$e Label in 10 Consecutive Cycles”.

In addition, we were honoured with a platinum award in the Green Purchaswi\$e Award category and a gold award in the Green Office Management Award category of the Inaugural Hong Kong Green Awards 2010 organised by the Green Council.



“Class of Excellence” Wastewi\$e Label Certificate

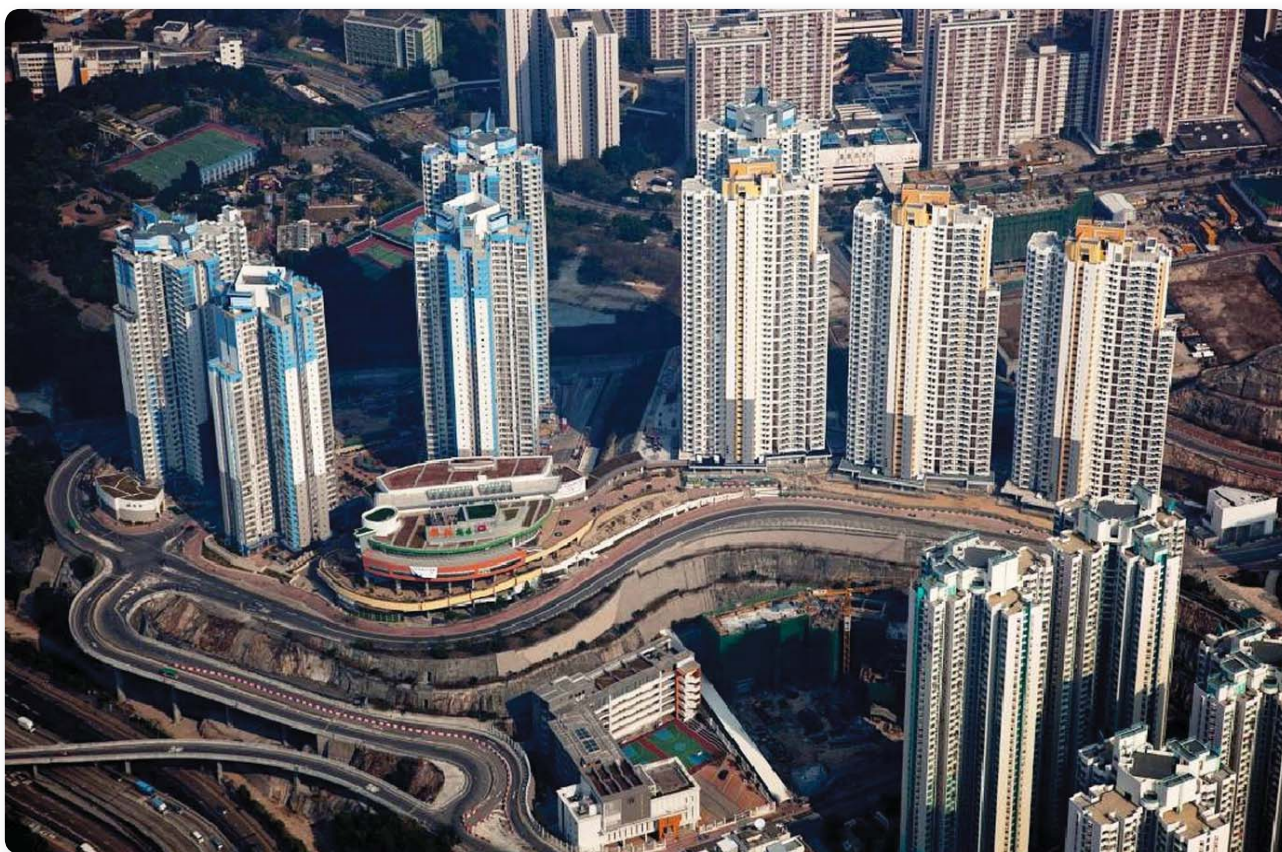


“Wastewi\$e Label in 10 Consecutive Cycles” Certificate

# Initiatives in Planning and Construction of New Housing Estates

## Micro-climate Studies

Introduced in 2004, the Micro-climate Studies have been employed to refine the placement of buildings and layout of external spaces with due consideration of site-specific natural features. Through computational fluid dynamics simulations, we can optimise the prevailing air flow, patterns of sun and shade, general views and noise levels in our building design. On-site validation on the effectiveness of earlier Micro-climate Studies was conducted at completed estates and high satisfaction levels were recorded. Similar studies were carried out at 20 ongoing projects during the year.

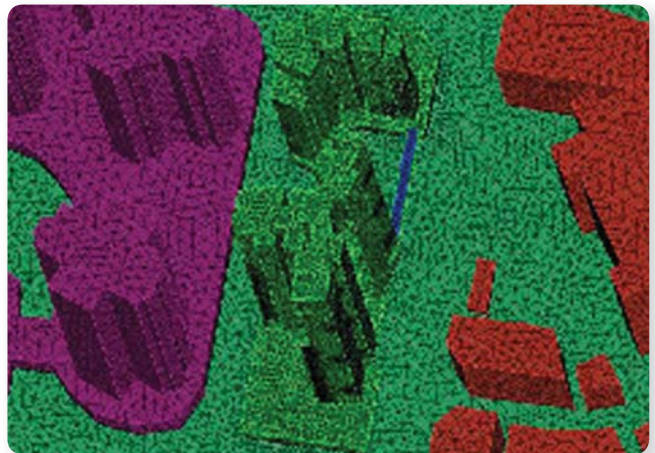
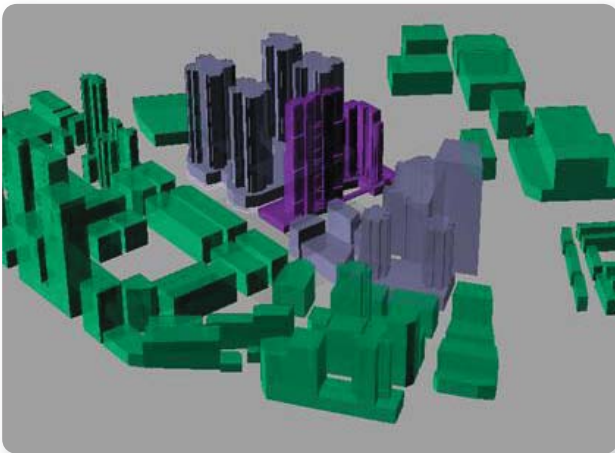


Choi Tak Estate – Newly Completed Estate Using Micro-climate Study



## Green Buildings

As an Institutional Member of the Hong Kong Green Building Council, we actively contribute to the development review of BEAM Plus which is the latest version of the Hong Kong Building Environmental Assessment Method (HK-BEAM) launched on 1 April 2010 to assess and certify green buildings. Many of the BEAM Plus requirements have been incorporated in the HA's Client Brief and Specification documents. These include, for instance, conducting Micro-climate Studies, incorporating standardised and modular components into building design, using recycled building materials, adopting pre-fabrication, enhancing energy efficiency, reducing energy and water consumption, introducing higher levels of green coverage, and adopting a two-level lighting. With the concept of "passive design" in mind, we believe green buildings should be designed for "using the least" rather than simply "saving the most". Up to now, we have a total of 15 projects assessed under the original HK-BEAM and three of them have achieved Platinum level. We have selected the ex-Yuen Long Estate project as a trial submission for the BEAM Plus assessment. To continuously improve green features in our buildings, we will use the BEAM Plus assessment methodology as a benchmark and incorporate appropriate requirements into our Client Brief and Specifications documents.



Three-dimensional Model and Meshing for Micro-climate Analysis for the Ex-Yuen Long Estate Project

## Energy and Carbon Emissions

### Energy Saving in Buildings

In line with the government's policy, we continue to impose requirements on the adoption of Building Energy Codes (BECs) and to obtain energy certificates for all completed blocks within one year after the certified completion date. The BECs, issued by the Electrical and Mechanical Services Department, aim to promote and encourage improvement in energy efficiency in local buildings. For the year 2010/11, we obtained a total of 59 building energy certificates for newly installed building services systems in nine building projects and all of them were received within the specified period.

As buildings account for the majority of the total electricity consumption at end-use level in Hong Kong, we strive to introduce and adopt many different green initiatives and technologies to cut down electricity consumption and look for the feasibility of using renewable energy sources in our PRH estates.

### Lighting Initiatives

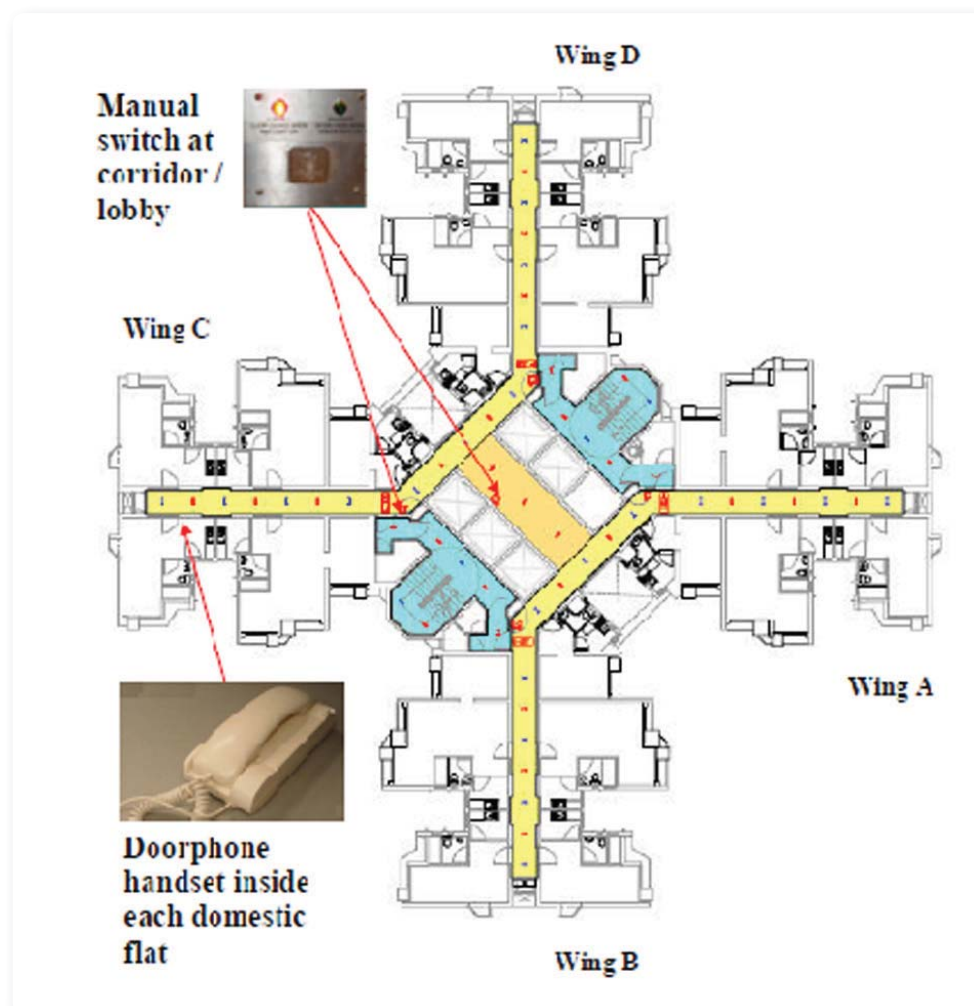
Lighting accounts for half of the total electricity consumption on a public rental housing (PRH) block. As such, we have put forward a number of energy-saving initiatives to cut down energy consumption of lighting in PRH estates.

Following the trial application of LED lighting system at Lam Tin Phase 7 and 8, the performance of which is under monitoring, we are conducting the trial installation of LED bulkhead for general illumination in corridors and staircases of the domestic blocks at Tsz Ching Estate. With reference to the assessment results of the trial run to be completed in the last quarter of 2011, we will consider the possibility of wider application of such LED bulkheads in other new estates.



Corridor Using LED Bulkheads

Another initiative is the introduction of a two-level lighting system in building blocks. The new lighting system to be installed for the public areas of domestic blocks such as lift lobbies and staircases provides moderate yet sufficient illumination levels which comply with the mandatory requirements laid down in the *Design Manual: Barrier Free Access 2008* issued by the Buildings Department. The lighting system is also equipped with motion sensors as well as manual switches which allow users to adjust the illumination level according to their needs. It is estimated that this innovative lighting system is able to achieve an annual energy savings of about 121 000 kWh for the public areas of a typical 41-storey domestic block with approximately 800 flats, equivalent to a reduction of 85 tonnes of CO<sub>2</sub>-e emission every year for each block. This new system has been applied in the design of our new PRH projects including Tung Tau Estate Phase 9, Un Chau Street Phase 5, Shek Kip Mei Phase 2 & Phase 5 and Lower Ngau Tau Kok Phase 1.



Two-level Lighting System in Building Block

## Use of Renewable Energy

Over the years, we have explored the feasibility of different forms of renewable energy by adopting a number of new technologies in our PRH estates on a trial basis. Some of the examples are highlighted below:

- Use of wind-solar hybrid energy lighting at Sau Mau Ping South Estate, which is in stable operation;
- Use of solar energy through a pilot grid-connected photovoltaic system using mono-crystalline silicon photovoltaic (PV) modules in Lam Tin Estate in 2009, which is also in stable operation; and
- Use of poly-crystalline silicon and amorphous silicon thin film PV modules in Eastern Harbour Crossing Site Phase 5 to be completed in mid-2011.



Wind-solar Hybrid Energy Lighting at Sau Mau Ping South Estate



Pilot Grid-connected Photovoltaic System in Lam Tin Estate



Amorphous Silicon Thin Film PV Modules in Eastern Harbour Crossing Site Phase 5



Poly-crystalline Silicon PV Modules in Eastern Harbour Crossing Site Phase 5



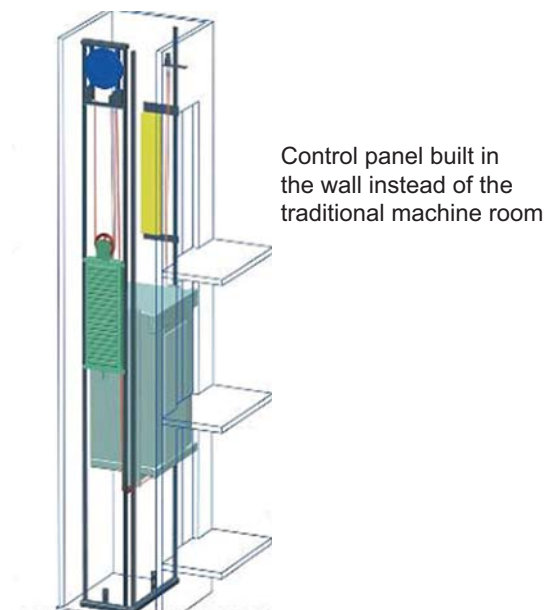
Moving forward, we plan to study the viability of other types of renewable energy technology including solar thermal energy for use in PRH estates.

### Other Energy-saving Initiatives

We adopted a range of hardware with new technologies to reduce electricity consumption in buildings. After a successful trial run at Ho Man Tin Estate, we adopted variable speed drive control for the fresh water booster pumping system in all our new PRH estates. The system will be used together with smaller stainless steel pneumatic pressure vessels and stamped stainless steel multi-stage pumps to extend the life span of the pumping equipment, achieve higher energy efficiency and occupy lesser plant room space.

Another example is the introduction of a hybrid ventilation system at three new shopping centres, namely Choi Tak, Yau Lai and the forthcoming “Domain” at Yau Tong. Combining the use of natural ventilation and mechanical air conditioning as well as switching between the two operation modes to suit users’ needs, the new system greatly reduces energy consumption and carbon emissions from the air-conditioning system.

There are also a number of energy-saving technologies and initiatives suitable for lift installations. These include the use of permanent magnet synchronous motor machines in lift installations to replace the conventional types of induction motor machines, and the installation of compact and less heavy lifts without machine rooms for lift towers and low-rise buildings. We have also tried the use of regenerative drives in high speed lifts. The device is able to generate electricity when the lifts are in operation to support the lighting and other equipments in the communal area.



Schematic Diagram of Lift without Machine Room



Other than lift installations, we have been studying the effectiveness of heat insulation of double wall. The study commenced in January 2011 and would be completed in end 2011.

During the year, we have completed the development of a tailor-made carbon emission estimation methodology to facilitate our housing design. This innovative tool allows us to estimate the total carbon emissions of a new PRH development throughout its entire life cycle at the design stage. With this estimation, we are able to manage the associated carbon emissions by developing suitable design alternatives to meet our target level.

## Air Quality

In 2010/11, we received eight air quality related complaints. Four of them were related to construction sites including construction dust, malodour and air nuisance, while the rest were related to renovation works in existing estates. The air complaints were recorded and properly addressed by the contractors concerned.

## Noise Control

Most of our noise issues are associated with the construction works. During the year, we continue our efforts to manage our contractors to abate noise nuisance as well as to reduce noise complaints.

### Noise Complaints

In 2010/11, we received 24 noise complaints. Twenty-two of them were related to construction sites while the remaining cases were related to renovation works in existing estates. The noise complaints were recorded and properly addressed by the contractors concerned.

### Other Noise Initiatives

To improve the acoustic performance of our buildings, we conducted a study to assess noise attenuation performance of the proposed acoustic window system to be installed for the proposed development at ex-San Po Kong Flatted Factory Site. Site measurements and numerical assessment for sound attenuation of the acoustic window have been completed and the result showed that the acoustic windows could achieve sound attenuation from 4 to 8 dBA for use in various flats types. Our other noise reduction initiatives is a study to assess the effectiveness of noise reduction of double slab, which commenced in January 2011.

## Waste Management

### Reducing Construction Wastes

We are cautious to select appropriate green construction methods and eco-friendly materials to reduce the quantity of construction waste generated and the amount required to be disposed of in landfills. We are committed to using recycled materials as far as possible in our construction projects. For instance:

- demolition debris was used for backfilling at six construction sites;
- cement-stabilised marine mud was used for backfilling at three construction sites;
- recycled glass and recycled aggregates were incorporated in paving blocks, roof tiles and other masonry items; and
- pulverised fuel ash was applied in vertical structural elements at three construction sites.

We also conducted a pilot run to replace cement with ground granulated blast-furnace slag (GGBS), a by-product of steel mills, in pre-cast concrete facades. Other than reducing the amount of waste disposal in landfills, all these initiatives enable us to save costs as well.

## Domestic Waste Handling

In addition to reducing the amount of waste generated, we also promote responsible waste handling in PRH estates to create a healthier living environment for our tenants and safer working environment for cleansing workers. To start with, we have introduced and provided mechanised refuse handling systems in all new PRH estates. The new system is equipped with a storage device at the bottom of each refuse chute to transfer fixed amount of refuse to a storage bin so that it can be properly sealed to avoid spillage and nuisance caused during the refuse collection and transfer process. The system is also equipped with, a bin cleansing machine to lessen the extent of physical work involved in the cleaning process. Both arrangements prevent workers from having direct contact with the refuse.



Volume Control and Storage Device of Refuse Handling System



Bin Cleansing Machine

## Water Conservation

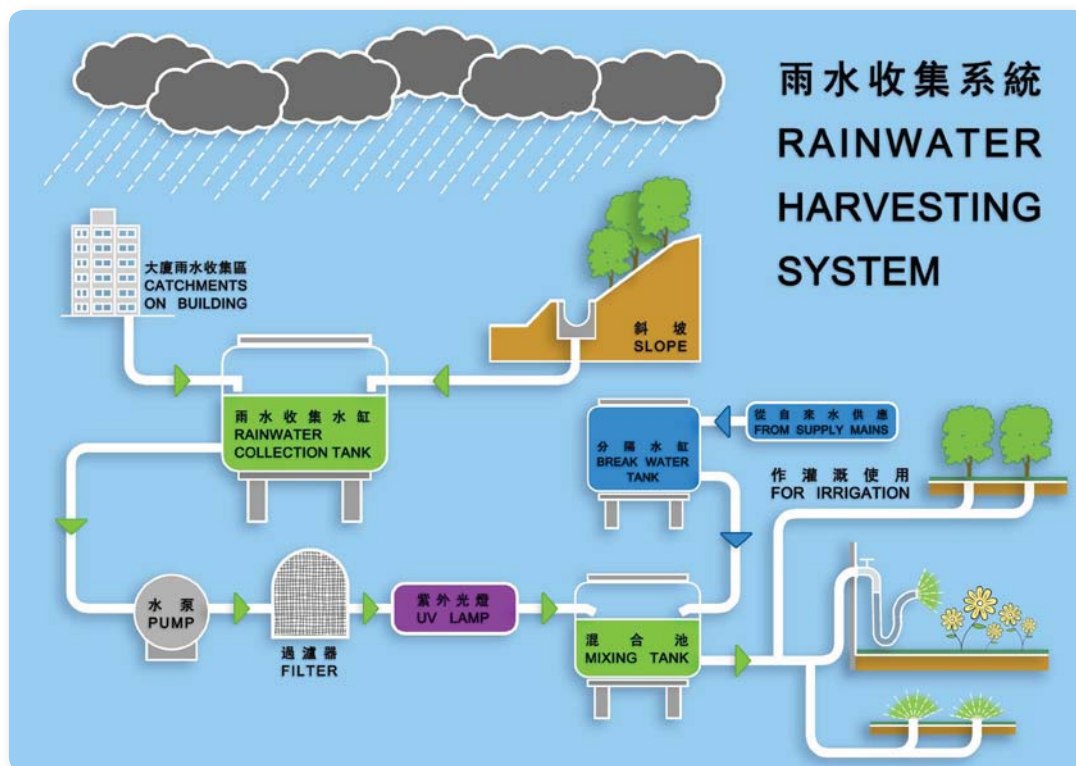
To conserve water in estates, we have introduced the “twin tank water supply system” in all new PRH estates since 2008. It has resolved the water supply interruption problem during tank cleansing. We also carried out a trial run to use dual flush cisterns in one of the blocks in Yau Lai Estate. We are currently studying the user pattern and water usage. We will continue to conduct the performance review in 2011/12.



Yau Lai Estate



Besides, we are currently exploring the use of other water conserving initiatives such as the use of water-saving faucets and rainwater harvesting systems in PRH estates. We target to promulgate specification for water efficient shower head and mixer in 2011/12. Following the installation of rainwater harvesting systems in two of our new shopping centres located at Choi Tak and Eastern Harbour Crossing Site Phase 6, we will continue to apply similar systems in at least 10 new PRH development projects.



Rainwater Harvesting System

In addition, we held a trial application on the use of reclaimed water from water-cooled air-conditioning system for irrigation in Yau Tong Phase 4 project. Water saving of this trial application would be monitored and validated at post completion stage.

The HA realises the importance of motivating tenants to participate in the water and energy conservation campaign. A consumption display panel at the ground floor lift lobby of each PRH block is proposed to offer information on water, electricity and gas consumption for common areas to our tenants. This information can facilitate comparison of energy and water consumption among blocks of the same estate in order to motivate tenants for wiser use of energy and water. A pilot installation is being carried out in Yan On Estate at Ma On Shan. We would monitor the effectiveness of the pilot installation in Yan On Estate and the feedback from tenants to review if this consumption display system is suitable for implementation in all future new estates.

## Greening and Landscaping

We work hard to green our estates in order to provide pleasant living environments to our tenants. We try to provide a higher greening ratio in our estates by adding more vegetation and green surfaces as far as possible. We set our goal for all new PRH estates to have a greening ratio of at least 20% per development, and to plant at least one tree for every 15 PRH units. We achieved these targets for all the newly constructed estates during the year.

We also introduced planting areas for community participation in master landscape layout plan in design stage of sizable new housing projects, and encourage PRH residents to participate in gardening and planting works in their own estates for recreation and education purposes. During the year, we introduced communal planting areas in the Tung Tau Cottage Area East project, Sheung Shui Area 36 West project and Kai Tak Phase 1B project.

During the year, we planted around 3 775 trees, 225 527 shrubs and 11 260 annuals in our newly completed PRH estates. In addition, all the newly formed slopes were provided with green treatment, which covered a total area of 7 075 square metres.

### Greening the Roofs

Green roofs absorb heat and act as insulators for buildings. They reduce energy needed to provide cooling and comfortable environment. In addition, green roofs can add aesthetic value to buildings. We completed green roof installation in five newly completed PRH projects at Choi Tak Estate, Choi Fook Estate, Tin Ching Estate, Mei Tung Estate and Chai Wan Estate in 2010/11. We would also further identify the potential for adding green roofs for other new estates.

To study the evapo-transpiration cooling effect, thermal insulation effect and air conditioning energy conservation effectiveness of green roof installed on top of domestic blocks, we are conducting a study on two residential blocks in Tseung Kwan O 73B. The Study commenced in March 2011 and is to be completed in 2013.

## Green Activities

We launched a community participation scheme, the “Action Seedling” to enhance our partnership with the contractors, public housing tenants and the community during construction stage. The programme encourages community participation in the greening of new housing estates in an early stage and six projects were completed in 2010/11. Through Estate Management Advisory Committees, local schools and community organisations, seedling plants will be given out by the HA and its building contractors to participants who will nurture the plants at home until they are ready for transplanting into the new estates. The programme helps foster a greater sense of belonging among the tenants and the community and provide an opportunity for our contractors to play their part in putting corporate social responsibility to work with the community towards greening and environmental protection.



Action Seedling





## Green Materials

We are committed to protecting the environment as far as possible by means of using eco-friendly materials and eliminating hazardous materials in our buildings.

### Use Softwood Timber Door

The performance review of the pilot use of softwood timber doors in the construction of Eastern Harbour Crossing Phase 4 was conducted during the year. The softwood doors were made of timber from sustainably managed forests and with the certification from the Forestry Stewardship Council (FSC). The review results show that there is no significant difference between the performance of softwood door and traditional hardwood door. We target to promulgate specification for FSC certified softwood door in PRH estates for implementation in 2011/12.

### Materials Conservation

As a green initiative, we encourage our construction contractors to reuse and recycle materials such as metal hoardings and metal formwork to conserve resources. In 2010/11, we conserved around 17 000 tonnes of timber from our construction projects.

We also use pulverised fuel ash (PFA) and ground granulated blastfurnace slag (GGBS) to partially replace the use of cement in concrete structures, concrete precast façade and prefabricated building parts to conserve resources and minimise eco-footprint. By replacing cement with PFA in the concrete mixes, we saved 18 000 tonnes of cement in 2010/11. By applying GGBS to the precast facades of all new projects in the near future, there will be a saving of about 300 tonnes of cement for each 41-storey domestic block.

## Control of Hazardous Materials

Improper handling or removal of asbestos containing materials may give rise to release of very fine fibres of asbestos which can lead to health problems. Started several years ago, our Asbestos Abatement Programme aims to abate the remaining asbestos containing materials in the HA managed building blocks. We set our goal to demolish not fewer than 10 building blocks which contain asbestos in 2010/11. During the year, altogether 13 asbestos containing blocks were demolished, comprising 10 domestic blocks, one school block and two factory blocks. Our target has thus been achieved.

## Biodiversity

Ma Hang Park was officially opened in August 2010. Located close to Ma Hang Estate and Murray House in Stanley, the park was jointly developed by the HA and other government departments with the support from the local community, the Southern District Council, green groups and professional institutions. One of the important initiatives of this project is to conserve the biodiversity of the ecosystem.

This five-hectare community park was designed with a theme of “conservation, education and recreation”. We have made the best attempt to preserve the original topography of the site, by incorporating eight thematic zones based on its natural character. The thematic zones provide a diverse range of recreational activities for people of all ages and are listed as follows:

- Butterfly Garden;
- Heritage Corner;
- Sea View Terrace;
- Sea Breeze Patio;
- Hill Top Plaza;
- Educational Trail;
- Fitness Deck; and
- Bird Watching Corner.

To further strengthen the local ecosystem and enhance biodiversity, we will further improve the vegetation of the park to attract more birds and butterflies to come for food and make homes there.



Site Map of Ma Hang Park



Main Entrance



Hill Top Plaza



Heritage Corner



Bird Watching Corner

In our pursuit to conserve the biodiversity, an ecological assessment will be conducted at feasibility stage for a project site with potentially high ecological value and good landscape character. The assessment will help formulate a plan to minimise the adverse ecological impact of the development and identify the opportunities for enhancement.



# Initiatives in Existing Housing Estates

## Energy and Carbon Emissions

Electricity consumption in the management and maintenance of our large number of housing blocks is the major source of carbon emissions in relation to our overall activities and services. Over the years, we have identified and practised numerous energy-saving initiatives in our managed housing blocks to conserve energy.

### Lighting Initiatives in Existing PRH

Since 2009, we have modified lighting circuits in corridors and lift lobbies of standard PRH blocks that were designed with good sunlight penetration, including the H-blocks, Harmony 3 blocks, and Small Households blocks. These installations allow us to switch off lights in daytime when there is sufficient natural illumination. Upon completion in 2010/11, we achieved total annual savings of HK\$1.08 million resulting from this initiative as well as a reduction of around 756 tonnes of CO<sub>2</sub>-e emissions.



Modified Lighting Circuits in Corridor Allow Switching off Lights Selectively in Daytime in Ho Man Tin Estate

Block Types	Annual Savings (HK\$ million)	Reduction in Carbon Dioxide Equivalent (CO <sub>2</sub> -e) Emissions (Tonnes)
H-blocks	0.1	70
Harmony 3 blocks	0.5	350
Small Household blocks	0.48	336

With the increasing popularity of using more energy-efficient T5 tubes in the market, we launched a three-year programme in 2008 to progressively replace older-type fluorescent tubes inside exit signs in our PRH blocks with the T5 model. Completed this year, the programme has replaced over 80 000 fluorescent tubes in exit signs. This replacement exercise has saved around eight million kWh of electricity per year, which is equivalent to a reduction of 5 600 tonnes of CO<sub>2</sub>-e emissions and a saving of about eight million dollars annually.

Besides our own initiatives, we also support other community events to save energy. For example, we participated in the Earth Hour 2010 to switch off all non-essential lights on our PRH estates for one hour.

### Other Energy and Carbon Initiatives

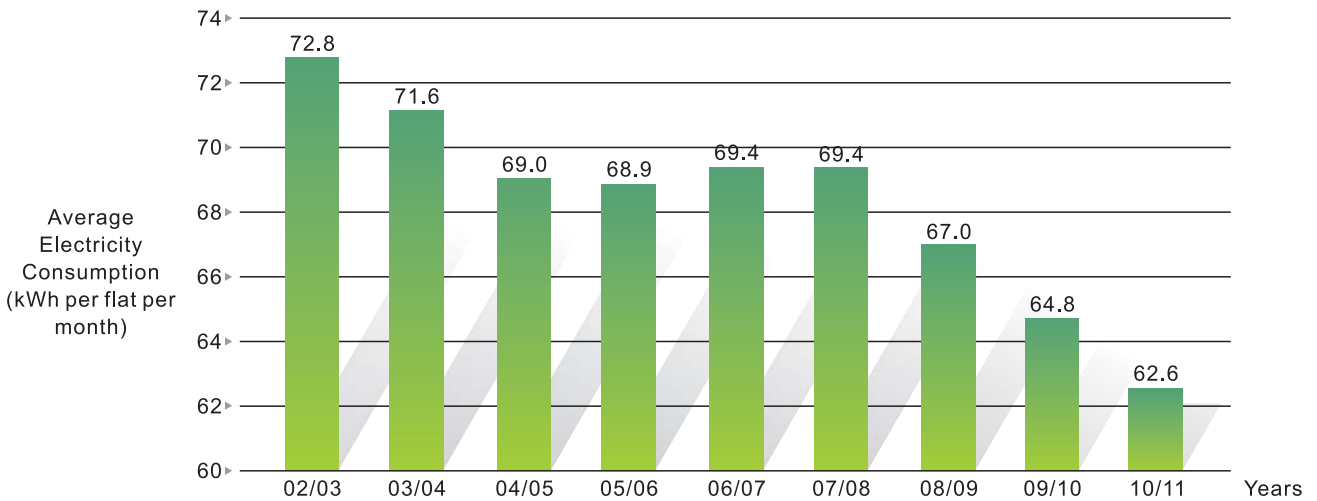
With the implementation of our range of energy-saving initiatives, we need to gauge our progress and performance in terms of energy consumption and overall energy efficiency. To this end, we conducted pilot energy audits in six of our existing PRH blocks. We also target to complete full energy audit in 28 existing PRH blocks and two existing shopping centres in 2011/12. Through these audits, we are able to evaluate the energy performance of the housing blocks and to identify and plan for further energy improvement and management opportunities.

Apart from energy audit, we started to conduct carbon audit in 2008 in order to calculate the buildings' carbon footprint and to identify opportunities for reducing carbon emissions. The audit was carried out for five HA premises including a mix of different types of buildings covering an office tower, two housing blocks, a shopping centre and a customer service centre. The second audit for these premises covering the period from August 2009 to July 2010 was completed during the year. The audit result shows 1.8% - 14.1% reduction in carbon emissions at these premises.

## Overall Energy Consumption

The electricity consumption of public areas of PRH blocks in 2010/11 was 62.6 kWh per flat per month, 3.4% lower than that of 2009/10 levels.

### Electricity Consumption in Public Area of Estates



## Overall Energy-saving in PRH

With our substantial effort on the implementation of various energy-saving initiatives, we continue to record a downward trend in the total electricity consumption in relation to the operation of the PRH estates. In 2001/02, the total electricity consumption in the management and maintenance of around 584 000 domestic flats in 1 040 blocks was 512 million kWh. The consumption was reduced to 473 million kWh in 2010/11 even though the number of flats had increased to over 629 000 units in 1 103 housing blocks in our service profile. This resulted in a saving of about 40 million dollars and accounted for the reduction of about 28 000 tonnes of CO<sub>2</sub>-e in our operations. We will uphold our momentum to cut down electricity consumption in our PRH estates.

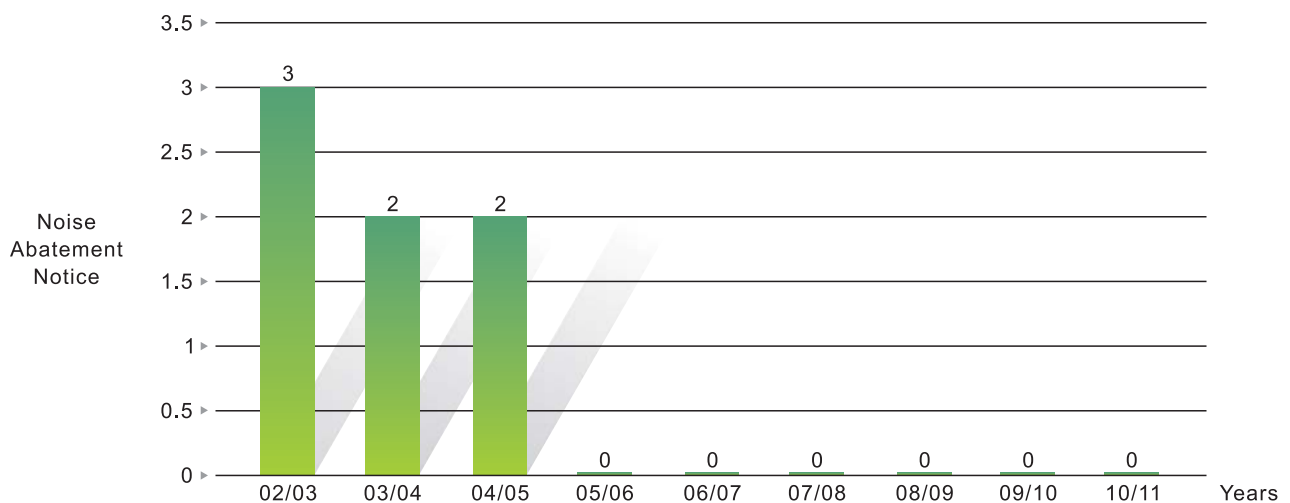
## Air Quality

The use of electric vehicles (EV) helps reduce carbon emissions, which is one of the major environmental problems in Hong Kong. To support the government's advocacy for the use of EV to greatly improve roadside air quality, we are currently negotiating with the China Light and Power to arrange for the installation of charging facilities in some of our car parks. We also target to install EV charging facilities in all of our new car parks.

## Noise

We did not receive any noise abatement notices issued to public housing estates by the Environmental Protection Department (EPD) in the sixth consecutive year.

**Number of Noise Abatement Notice Received**





## Waste Management

Waste is a common problem of affluent economies like Hong Kong. When people can afford more purchases, more rubbish will result. In 2010, the per capita disposal rate of municipal solid waste, i.e. solid waste from households, commercial and industrial sources, was 1.29 kilogrammes per day in Hong Kong, which has placed tremendous pressure to the existing landfills.

To alleviate the waste problem and slow down the pace of using up landfill spaces, we have implemented various waste reduction and recycling initiatives to minimise the generation of waste in both PRH estates.

### Waste Reduction in Estates

Over the years, we have put substantial effort to promote separating domestic wastes at source and waste recycling in PRH estates. Since 2005, we have participated in the Source Separation of Domestic Waste Programme launched by the EPD. Under the programme, recyclable domestic wastes such as waste paper, plastic bottles and aluminium cans are segregated for recycling. The programme has been successfully implemented in all our estates.

We also worked with the EPD to launch a pilot run in December 2010 on glass bottle recycling. Six PRH estates in the Kowloon East region were selected to participate in the trial run and special facilities were provided for users to return glass bottles. We will review the pilot programme at the end of 2011.

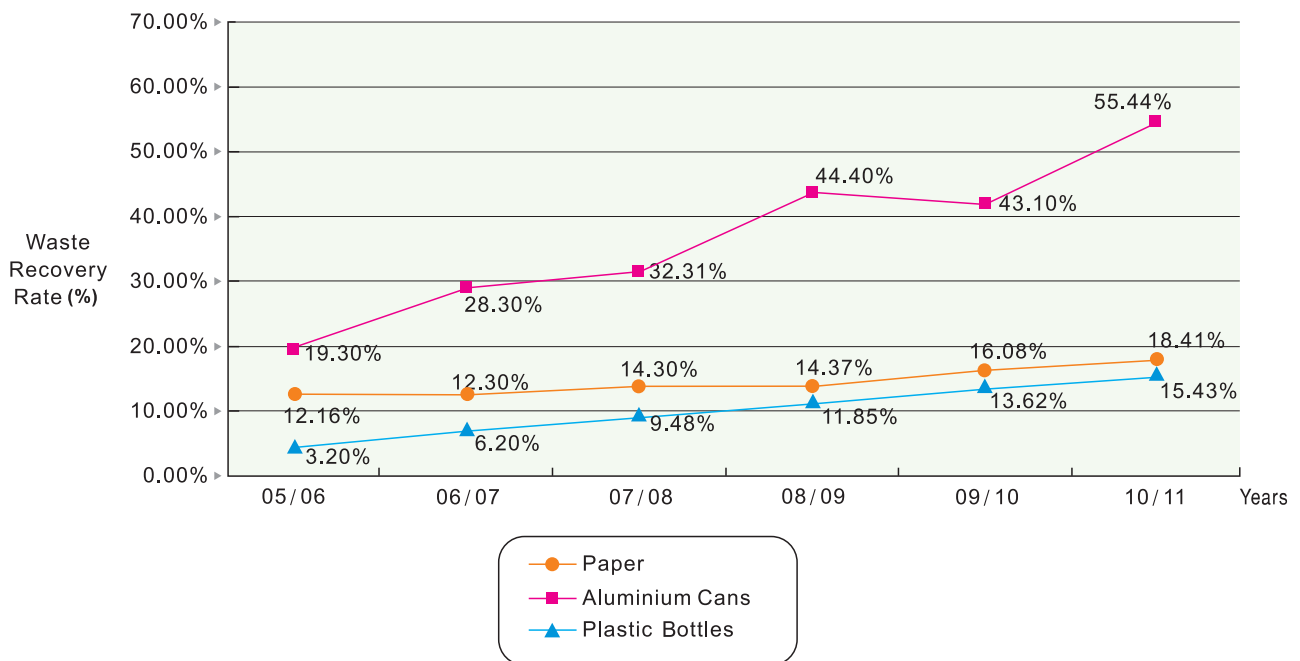


Glass Bottle Recycling Facilities

Apart from paper, plastic bottles, aluminium cans and glass, we also collect rechargeable batteries, fluorescent lamps, obsolete computers and other recyclable items in our PRH estates. Some of the collected items like used computers and other electrical and electronic appliances are sent to charities for recycling. The amounts of waste recovered for recycling in PRH estates from 2006/07 to 2010/11 are provided below.

Waste Type	Quantity of Waste Recovered (tonnes)			
	2007/08	2008/09	2009/10	2010/11
Paper	14 748.2	14 193.7	17 934.8	21 376.0
Aluminium Cans	309.6	495.9	520.0	865.2
Plastic Bottles	764.6	939.3	1 218.0	1 427.2

### Waste Recovery Rate



During the year, we also work with charitable organisations to collect 843.5 tonnes used clothes.

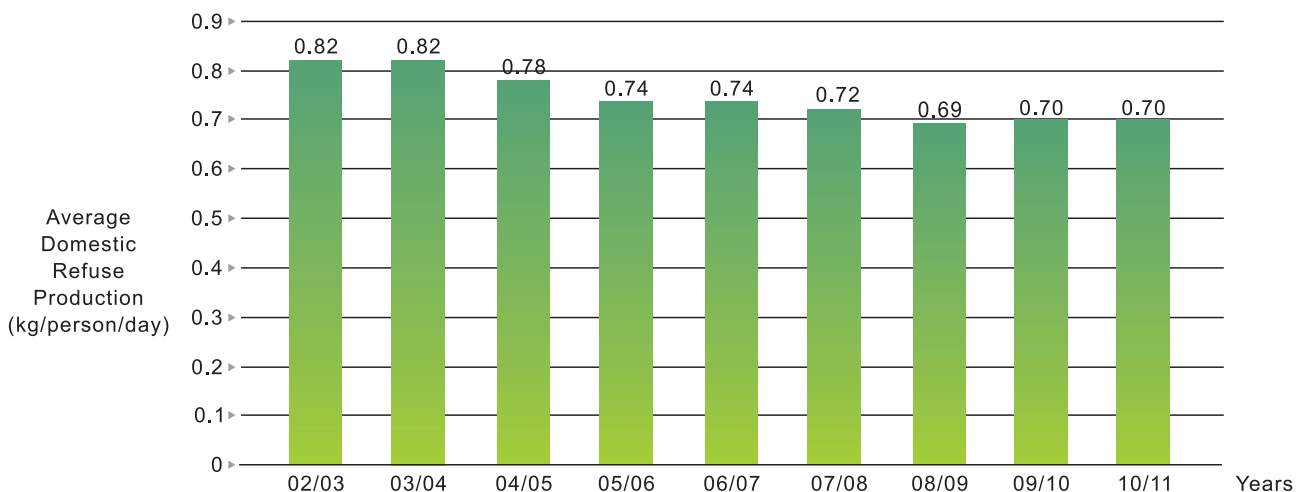
To further boost the participation of tenants in waste recycling, we held a Recyclable Waste Exchange Incentive Scheme in PRH estates. Tenants were encouraged to deliver their recyclable household waste to collection counters in the estates to exchange for small incentives.



Recyclable Waste Exchange Incentive Scheme in Lei Yue Mun Estate

With our diverse range of waste reduction initiatives, the average domestic waste generation from our residents was 0.70 kg/person/day in 2010/11. Our target has been fully met. There is 14.6% reduction as compared with 2002/03 and it is 19.5% lower than the per capital domestic waste generation in Hong Kong in 2010 (0.87kg/day).

### Average Domestic Refuse Production from Residents



## Water Conservation

It is important to protect and conserve our scarce water resources to ensure reliable and safe supply of water to our tenants. During the year, we set water saving targets in relation to both potable and flushing water in estates.

We have reduced potable water consumption in common area through identification and repair of leaking water pipes. We achieved our water reduction target by reducing 0.16% water consumption during the year, surpassing the target of 0.1% reduction of 2009/10.

## Estate Greening and Landscaping

Greening is one of our important aspects in the pursuit of environmental excellence in our housing estates. During the year, we continued our efforts to green our new developments and improve the landscape of our existing estates. We also incorporate vegetation such as vertical green panels in open areas of our commercial facilities.

In 2010/11, we completed improvement works under our Landscape Improvement Programme in 18 existing estates to revamp and improve their green features. Under the programme, two thematic gardens were developed, the Rainbow Garden at Choi Hung Estate and the Love Garden at Yau Oi Estate. Additionally, we partnered with Estate Management Advisory Committees in 25 estates to promote awareness of the value and importance of sustaining a healthy green environment to our tenants through a diverse range of activities including the installation of community gardens for the use of tenants in five estates.



Rainbow Garden at Choi Hung Estate



Love Garden at Yau Oi Estate





Community Garden at Lung Hang Estate



Community Garden at Oi Man Estate

For existing estates, we planted around 1 154 trees, 473 292 shrubs and 79 761 annuals. Moreover we provided green treatment to hard surfaced slopes and improvement to existing vegetated slopes. During the year, we completed improvement works for 10 slopes by seed broadcasting, stone pitching and provision of planter and shrubs.

### Greening the Roofs

Vegetation growth on our trial green roofs at four existing estates, namely Wo Lok Estate, Fu Shan Estate, Choi Hung Estate and Fuk Loi Estate is satisfactory and is under close monitoring. We would also further identify potential green roofs in estates currently under the Estate Improvement Programme.

### Tree Management

Trees within PRH estates were used to be managed by respective estate managements. There are around 100 000 trees under the HA's management. In view of the huge amount and significance of our tree stock, we established a Tree Management Unit in July 2010. We have gone on to develop a centralised electronic tree database to identify the exact location and store inventory data for every tree by using the Geographic Information System. The Unit is responsible for closely monitoring specialist tree works contractors to examine the health of trees as well as carrying out remedial measures to cure those with health problems.

We have also implemented community-wide surveillance on trees through the "Estate Tree Ambassador Scheme" since September 2010 to engage estate residents in tree health and risk monitoring. Up to the end of March 2011, we have enrolled more than 380 Estate Tree Ambassadors (ETAs) who have received basic tree management training and simple practice guides for facilitating their surveillance and identification of problematic trees.

## Green Activities

To create a green living environment, we cannot solely work on our own. It is important to bring the messages to our tenants. During the year, we involved the residents in a wide range of green activities aiming to raise their level of environmental awareness.

We have partnered with three green groups to launch the yearround community environmental programme “*Green Delight in Estates*” (GDE) since mid-2005. The programme aims to raise the environmental awareness of PRH tenants and instill a culture of protecting and improving the environment in a fun way. It comes to the fifth year in 2010/11 and a wide range of campaigns with “carbon reduction” as the main theme were conducted in all our estates and more infrastructure work was completed in 33 selected PRH.



Community Activities of “Green Delight in Estates”

To further enhance tenants’ awareness and support of greening in PRH estates, we organised tree planting days in Sun Tin Wai Estate, Yau Oi Estate and Choi Hung Estate in 2010. Besides, we have promoted environmental awareness in HOS estates managed by HA through the Property Management Agents. During the year, around 220 activities of various natures were organised including poster display, collection and recycling of used clothes and materials, promoting waste reduction by organising relevant training/seminars; conducting recycling competition and activities; and promoting energy saving by reducing public lightings, etc.

During the year, we worked with individual Estate Management Advisory Committees to organise the Estate Green Fun Day in 18 PRH estates. We also initiated a recycling campaign in seven estates to promote better recycling practices and eventually avoided sending over 1.5 tonnes of recyclable materials to landfills.



Estate Green Fun Day at Cheung Hong Estate



Estate Green Fun Day at Fu Tung Estate



Estate Green Fun Day at Wah Fu (II) Estate



## Initiatives in Office at Work

We have implemented a number of green initiatives to improve our internal environmental performance. To promote the use of green materials, we have been using environment-friendly paper in printing of all publicity materials (except sales and marketing publications). In addition, we managed to green the roof of our headquarters building in Ho Man Tin.



Green Roof at Housing Authority Headquarters

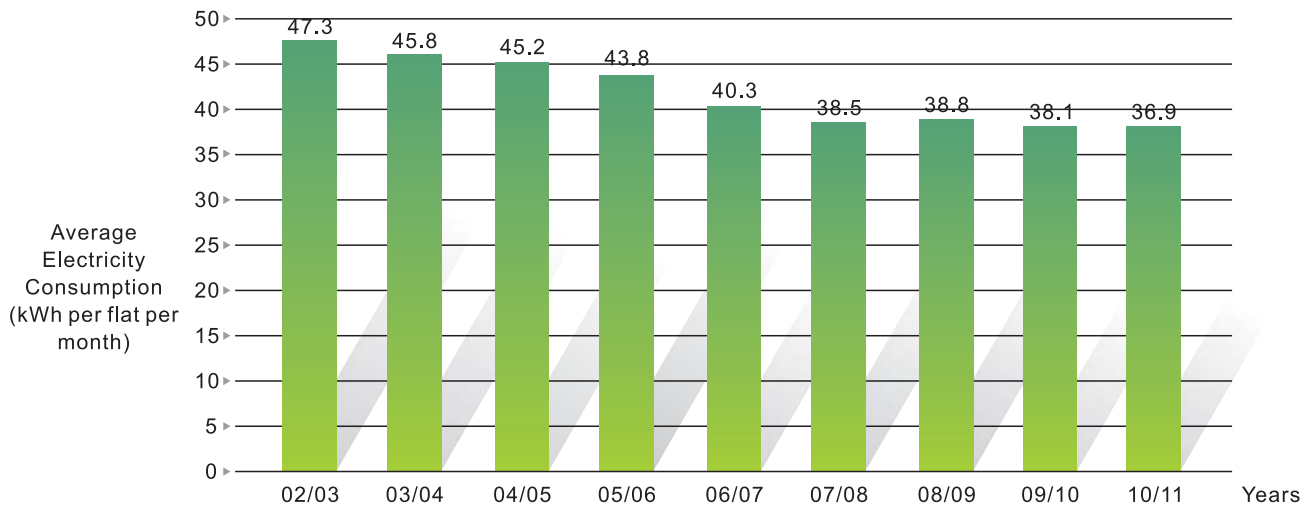
## Energy and Carbon Initiatives

We started to conduct carbon audit in 2008 for one of our headquarters buildings as well as a customer service centre in order to calculate the buildings' carbon footprint and to identify opportunities for reducing carbon emissions. The second audit for these buildings covering the period from August 2009 to July 2010 was completed during the year.

Over the past decade, we have achieved our annual electricity savings target in the HA offices. In 2010/11, we consumed 36 923 012 kWh of electricity which is about 4.2% reduction from 2007/08 and 3.2% reduction from 2009/10 in the total electricity use of our offices. This decrease of 1 226 713 kWh electricity as compared with that of 2009/10 is equivalent to a reduction of around 859 tonnes of CO<sub>2</sub>-e emissions and monetary savings of around HK\$1.2 million. This result is partly due to the introduction of mandatory energy-saving requirements for IT and office equipment in both our headquarters and remote offices during the year.



## Annual Electricity Consumption in HA Offices



Fuel consumption of the HA's vehicle fleet during the year was 94 713 litres over a total run of 610 229 km. This represents a 2.7% deduction in fuel consumed per km as compared with that in 2009/10.

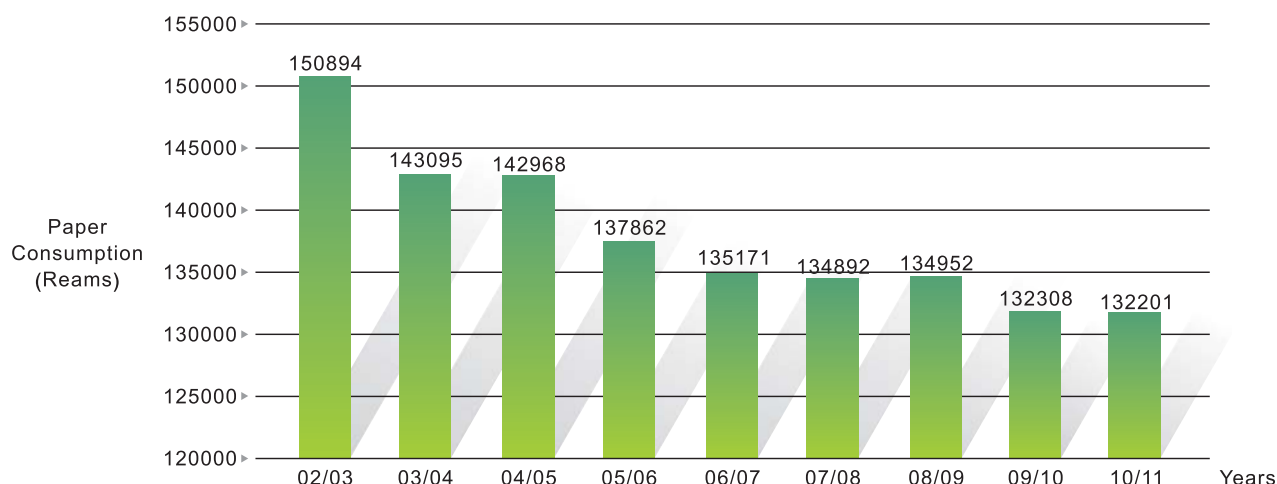
## Air Quality

Following our effort to ensure indoor air quality for our staff, Blocks 1, 2 and 3 of our Headquarters Building were awarded the Indoor Air Quality (Good Class) Certificate, which was issued by EPD.

## Waste Management

One of our main themes for the year was reduction of paper consumption through IT, which includes wider use of e-reports and electronic filing. After enhancing the e-operation, we recorded a consumption of 132 201 reams of paper in 2010/11, about 2% lower than the consumption in 2007/08. The quantity of waste paper collected in the HA offices in 2010/11 was 30.9 kg of waste paper per staff, about 64% higher than the quantity collected in 2008/09. We comfortably met both departmental targets during the year.

## Paper Consumption in HA Offices



## Water Conservation

In reducing our internal water consumption, we have used water taps with motion sensors, conducted frequent inspection to minimise pipe bursting and leakage and promoted water saving tips to raise staff's awareness. The water saving result in our headquarters is encouraging. In 2010/11, we consumed 12 507 cubic metres of water in our headquarters. It was significantly reduced by 16.5% as compared with the target consumption of 14 980 cubic metres.

## Green Activities

We worked with green groups and other government departments to support green activities such as the annual Green Carnival and Hong Kong Tree Planting Day. We also participated in the Hong Kong Flower Show 2011 organised by the Leisure and Cultural Services Department to show our expertise in the creation of green environments. The design of our display "Green Delights at Home" echoed the theme of the show "Symphony of Spring Flowers" and conveyed the HA's vision of building ideal homes. We also incorporated the universal design concept and people-oriented approach in the landscape design so as to enable visitors of all ages, disregard their physical abilities to visit our display. The HA's display won the Gold Award for Outstanding Exhibit (Landscape Display) in the event.



Green Carnival



Hong Kong Tree Planting Day



Permanent Secretary for Transport and Housing (Housing) Duncan Pescod Visits the HA's 'Green Delights at Home'



HA's Green Delights at Flower Show

Internally, we have organised various activities to enhance staff environmental awareness and knowledge. During the year, we conducted six environmental seminars and arranged five panel displays showing environmental issues at Green Corner in HA headquarters to raise staff awareness. We also arranged a recycling campaign at the HA headquarters in June 2010 and January 2011.

To monitor the environmental awareness of housing staff and enhance general awareness, HA conducted a survey to gauge the environmental awareness of HA staff for management review on environment training and publicity programmes. The survey covered all serving staff in HA, including both professional and non-professional staff of all divisions working at the HA headquarters and out-station offices. The survey result showed that a vast majority of the housing staff (98.4%) realized the importance of environmental protection and 97.6% housing staff had put it into practice in their daily work and living, such as reducing paper consumption, saved energy, and waste separation. Nevertheless, staff awareness of the environmental protection activities in HA and participation rate of some environmental protection activities organized by HA are still to be improved. In view of this, we proposed a number of improvement actions to raise the staff awareness and their participation in HA's environmental protection initiatives and activities, including a large scale staff environmental awareness quiz and enriching the Green Corner display at the HA headquarters.