

Environmental Performance

- Initiatives in Planning and Construction of New Housing Estates
- Initiatives in Existing Housing Estates
- Initiatives in Office at Work



Initiatives in Planning and Construction of New Housing Estates

Environmentally Responsible Planning and Design

Micro-climate Studies

We have 10 years of success for implementing micro-climate studies during site planning and design process for high-rise public housing. Based on a computer simulation with prior calibration of software in accordance with local climatic conditions, including wind environment, natural ventilation, pollutant dispersion, natural daylight and solar heat gain, etc., the micro-climate studies were applied in our planning and design stages of our projects. This year, we continued to carry out micro-climate studies for 50 on-going projects, in addition to Air Ventilation Assessment for 31 on-going projects.

Low Carbon Building Design

To help achieve the Government's target of reducing 50%-60% greenhouse gas emissions (GHG) from 2005 to 2020, our team has put substantial efforts to apply various green building strategies during the design and construction stages to cut down carbon emissions of our housing development projects.

We apply passive design for our housing development projects to provide quality buildings with low carbon footprint and high energy efficiency through optimising the use of daylight and natural ventilation.

Since 2011, we have adopted Carbon Emission Estimation (CEE) which applies a Life Cycle Assessment (LCA) framework to estimate the GHG emissions in terms of carbon dioxide equivalent ($\text{CO}_2\text{-e}$) of a public housing block from cradle to grave. The CEE also enables us to benchmark the emission level among our projects throughout the life cycle stages in order to facilitate comparison and to set achievable goals for improvements. During the year, we applied the CEE method for all 13 projects with domestic blocks at detail design stage.

Construction of Green Buildings

Using Green Materials and Components

The concept of sustainable building incorporates and integrates a range of green strategies during the design, construction and operation, one of which is the use of green materials and components for our projects.

To use more green materials and components, we have specified using the following recycled materials in our contracts:

- pulverized fuel ash (PFA) to partially replace cement in structural concrete with mass concrete pouring, such as transfer plates or beams, for all building contracts;
- recycled rock-fill in earthworks and recycled sub-base materials in roadworks for all building and civil engineering contracts;
- recycled rock retrieved at ground investigation works for landscaping and associated works as far as practicable for new building and civil engineering contracts;
- ground granulated blastfurnace slag (GGBS) to partially replace cement in concrete for manufacturing precast facades in domestic blocks for all building contracts;
- concrete paving blocks with recycled glass cum aggregates at the areas planned for concrete paving blocks for new building and civil engineering contracts;
- marine mud converted by cement stabilisation treatment from site to useful backfilling material for all piling contracts;
- re-usable modular hoarding using bolt-and-nut fixing for suitable projects; and
- synthetic macro-fibre reinforcement in on-grade slabs where applicable.

During the year, we achieved a saving of about 27 000 tonnes of cement by replacing part of the concrete mixes with PFA.

In addition to specifying to use GGBS to replace 35% of cement in concrete for precast facades, we have further specified using GGBS to replace 60% of the cement in mass concrete pouring, such as that for pile caps, in a pilot foundation contract. Furthermore, we are now in progress to study using GGBS in precast semi-slabs, precast beams, precast staircases and precast refuse chutes.

To further promote the use of green construction materials, we specified not to use virgin forest products for temporary works during construction in our contracts, but to use softwood timber from sustainable source for all types of timber doors in public rental housing (PRH) estates. We are preparing specification which requires a minimum of 50% of all timber by volume for doors to be from sustainable sources. The latest draft specification also allows the use of finger joints and composite joints in timber doorsets to reduce the quantity of raw materials used in manufacturing process.



Finger joints in timber doorsets



Composite joints in timber doorsets

We continued to adopt ISO 14001 Environmental Management Systems (EMS) certification as a general requirement for the suppliers of 16 selected major building materials in new works projects, as well as a requirement in maintenance and improvement works contract for selected building materials.

Enhancing Environmental Performance during Construction

Sustainability has been emphasised during construction of our new housing estates. Requirements have been imposed on the contractors for our new building, demolition, piling and civil engineering projects in enhancing their environmental performance during construction. These include:

- Submission and implementation of environmental management plan;
- Banning the use of incandescent light bulbs for temporary lighting on site;
- Use of generators with Quality Powered Mechanical Equipment (QPME);
- Mandatory installation of water recycling facilities;
- Restriction of vehicle speed on site;
- Adopting precast concrete hard paving at all piling and building sites;
- Use of precast concrete component;
- Provision of solar hot water heaters in workers' shower area;
- Provision of food waste composting facility at remote locations with site canteen or catering service;
- Provision of greening on site;
- Using electric vehicle as contract cars at sites within specified round trip distance; and
- Recovery of undamaged timber pallets for locally manufactured pavers for reuse or recycling.



Mandatory installation of water recycling facilities



Use of precast concrete component



Provision of solar hot water heaters in workers' shower area



Provision of food waste composting facility at remote locations with site canteen or catering service



Provision of greening on site



Use electric vehicle as contract cars

We promulgated a specification requiring the reuse or recycling of undamaged timber pallets in April 2013. We are also developing a database on non-inert construction and demolition recyclable materials from construction sites for access by recyclers to facilitate waste recycling.

As an on-going initiative, we have incorporated precast elements, including facades, stairs and semi-slabs in the design of all projects. Volumetric precast bathrooms and kitchens, precast beams, roof parapets, manholes, cable draw pits and drainage channels were adopted in various projects where applicable. Construction of precast segmental roof water tanks is on trial.

By adopting environment-friendly construction practices in our projects, such as precast concrete components, metal formwork and metal hoarding, we have conserved around 13 430 tonnes of timber in 2013/14.



Precast manholes used in Shui Chuen O Phase 1

Hong Kong BEAM Plus and Chinese Green Building Evaluation Label

At all times we strive to find ways to improve environmental performance of our housing development across their life cycle. In this regard, we have adopted some of the renowned green building certification schemes such as BEAM Plus and Chinese Green Building Evaluation Label.

We set our requirements in the contract specifications to ensure that all our new projects are capable of achieving a “Gold” rating under the BEAM Plus scheme. During the year, our development projects of Ex-Yuen Long, Ex-Au Tau and Tung Chung Area 56 exceeded the target and achieved a higher standard of “Provisional Platinum” rating under BEAM Plus version 1.2; and development projects of Domain and Kai Ching Estate were awarded “Platinum” rating under BEAM version 4/04.

Development projects of Kai Ching Estate and Ex-Yuen Long Estate also received the highest (three-star) level of the Chinese Green Building Evaluation Label.



Domain



Kai Ching Estate

Energy Conservation

Managing Energy through ISO 50001 Energy Management System

Using energy efficiently will help us conserve resources and tackle climate change. Since 2011, we have started to implement an Energy Management System (EnMS) for our housing development projects in accordance with the international standard ISO 50001:2011. In June 2012, we obtained ISO 50001 certification, the first organisation in Hong Kong obtaining such certification in residential building design. In 2013/14, we conducted energy estimation under ISO 50001 for 14 projects and will implement it in all domestic blocks at the design stage.

During the year, after full consultations with stakeholders and industry associations, we set a mandatory requirement for contractors to obtain ISO 50001 certification for admission to the Housing Authority (HA) lists of Building (New Works Category) and Piling Contractors on or after 1 January 2014. For contractors who were already admitted to the list before 1 January 2014, they are required to obtain the ISO 50001 certification on or before 31 December 2015.

Achieving Energy Efficiency in Buildings

The HA has been one of the pioneers in adopting the non-statutory Building Energy Codes (BEC) under the voluntary Energy Efficiency Registration Scheme for Buildings (EERSB) to reduce the operational energy of new public housing developments, prior to the full operation of mandatory BEC in September 2012.

During 2013/14, we have received 72 energy certificates under EERSB from Electrical and Mechanical Services Department, demonstrating our efforts to meet energy efficiency requirements in lighting, electricity, air-conditioning, lift and escalator installations.

Use of Renewable Energy

Photovoltaic (PV) system converts the inexhaustible solar energy to electricity with low carbon emission. During the year, we continued our success of incorporating the grid-connected PV system in all new public housing developments under the planning and design stage. Riding on the success of implementing the grid-connected PV system in Lam Tin Estate Phases 7 and 8, Eastern Harbour Crossing Site Phase 5 and Kai Tak Site 1A, we completed similar installation the grid-connected PV system at Kai Tak Site 1B in 2013/14.

While the design of the PV systems caters for at least 1.5% of the communal electricity consumption, we are conducting a study to review the actual effectiveness of the existing installations.



Solar panels at Kai Tak Site 1B

To enhance the community awareness of environmental protection, we have installed one to two solar-powered lights in each of the PRH and HOS developments for educational purpose.

Reducing Energy Consumption of the Lighting Systems

In view of the better luminous efficacy of light emitting diode (LED) lighting, we have been proactively studying LED lighting applications for our new PRH to further reduce energy consumption in our housing blocks. In addition to conducting a study for testing nine brands of LED bulkhead prototypes in Tsz Ching Estate, we are implementing a large-scale trial of LED bulkheads with refined design in Kai Tak Site 1A to evaluate their performance and product reliability.

We have also extended our applications of LED bulkhead lights in the design of selected projects, including Anderson Road Site A and B and Chai Wan Factory Estate. In future, we will consider wider applications of LED bulkheads when the products are proven to be reliable and cost-effective.



Trial installation of LED bulkheads in Kai Tak Site 1A

Reducing Energy Consumption of Lift Installations

Lift systems are the second largest electricity consumers amongst communal facilities of domestic blocks, and their operation has great energy saving potentials. We have stipulated the use of gearless lift machines and regenerative power for lift motors of 18kW or above in the latest specifications for new lift installation. During the year, we completed the installation of lift regenerative power systems for domestic blocks at Kai Tak Site 1B. The performance of the systems is being monitored. We are also exploring opportunities to apply new lift technologies like permanent magnet synchronous lift motor in some projects.

Optimisation of Lighting in Domestic Blocks

Since 2008, we have developed a two-level lighting control system for lift lobbies, corridors and staircases in domestic blocks, whereby light levels are operated by environmental lighting controls using motion sensors and on-demand switches with timer-controls. All of these measures followed our lighting-on-demand principle for saving energy.

During the year, we continued to implement environmental lighting controls at the communal areas of all domestic blocks. To evaluate energy saving performance of the lighting controls, we monitored the energy usage for lighting in communal areas of Tung Tau Estate Phase 9, Un Chau Street Phase 5, Lower Ngau Tau Kok Phase 1 and Shek Kip Mei Phase 2 development projects. The preliminary results indicated that there was about 30% of energy saving with the implementation of environmental lighting controls.



Manual push button of two-level lighting control system

Smart Meter

We have developed a smart meter cum information display system to show the average electricity, gas and water consumptions per flat in an estate. This system is placed at the main entrance lobbies of each domestic block where tenants can obtain energy/resource figures of different blocks within the same estate and use it as a benchmark for improving performance.

Application of Hybrid Mode of Ventilation

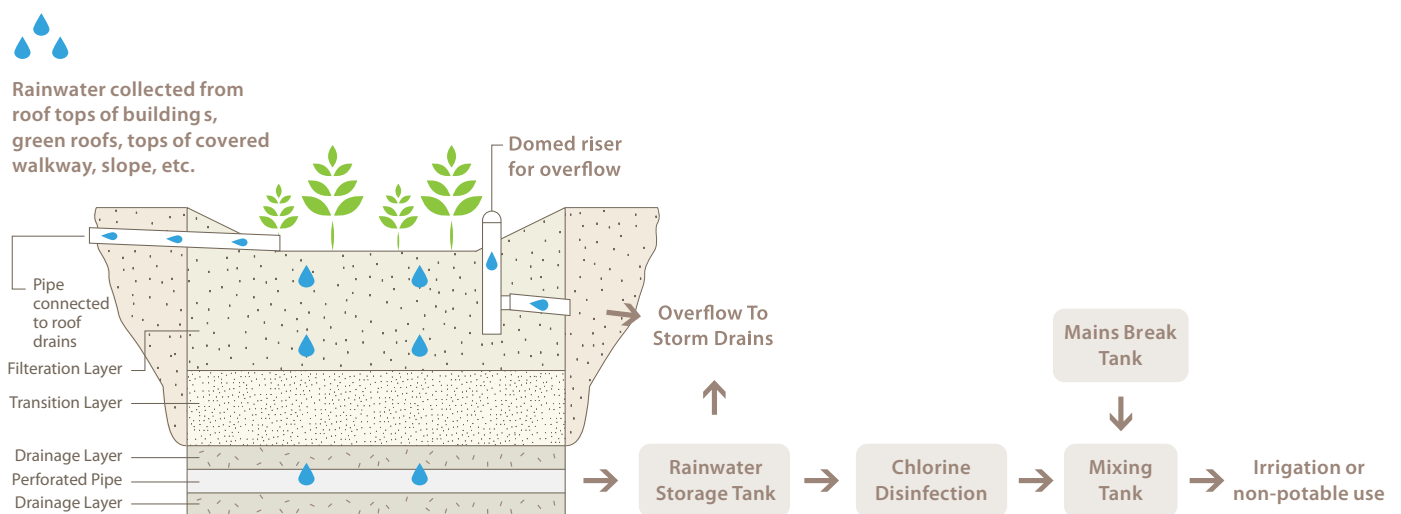
We continued to adopt the hybrid mode of ventilation in Yau Lai Shopping Centre, Choi Tak Shopping Centre and Domain to save energy of air conditioning and mechanical ventilation systems. The performance of this kind of system was evaluated and guidelines for implementation of hybrid mode of ventilation were prepared during the year to facilitate future applications in other suitable projects.

Water Conservation

We have been exploring every possible means to better utilise and conserve water resources.

Since 2010, we have been adopting the Rainwater Harvesting System (RWHS) to supplement fresh water supply for irrigation purposes. During 2013/14, we have reviewed and simplified the design for RWHS to reduce its carbon footprint. The simplified RWHS is now regarded as a standard provision in PRH developments if either carbon neutrality or BEAM Plus requirements on water irrigation can be met. During the year, we completed the installation of RWHS for Kai Tak Site 1B and Tseung Kwan O area 65B. We have also continued to monitor the water saving to study the performance and effectiveness of the completed RWHS installations.

Building on the rainwater harvesting technique, we have further introduced an integrated water sensitive urban design for our new developments at Shui Chuen O and Au Tau. In these projects, an innovative low-carbon design solution was adopted whereby rainwater collected at high elevations such as building rooftops, green roofs, covered walkway roofs and planted slope would be treated via bioretention and held in storage tanks for reuse.



We have continued to monitor the use of reclaimed water from water-cooled air conditioning system for irrigation at the Domain. We have engaged a local university to study the system performance, which will be completed by 2014/15.

In 2012/13, we promulgated specification to reduce the flushing volume of single flush water closets from 7.5 litres to 6 litres. In 2013/14, we have prepared specifications of 6-litre dual flush water closets for selected projects use.

To further reduce the consumption of potable water, we have promulgated specification to use water efficient shower handset and mixers to the requirements of BEAM Plus and Water Supplies Department's Water Efficient Labelling Scheme for our projects.

Greening the Environment

We have established an overall target of 30% green coverage for all new housing projects, with a minimum of at least 20%. To further strengthen greening initiatives in both PRH and HOS developments, all new housing projects are planned with a tree planting ratio of not less than one tree per 15 flats.

To promote community involvement in greening of our new PRH, we introduced community planting areas in the master landscape layout plans for projects at Ex-Shatin Married Quarters, Tai Pak Tin Street and Sai Chuen Road during the design stage to encourage PRH residents to participate in gardening and planting works within their own estates.

During the year, we have arranged the Action Seedling Programme for the following estates to encourage local residents and the community to participate in early plant raising within the new housing estates.

- Kai Tak Site 1A Phases 1 & 2;
- Kai Tak Site 1B Phases 1, 2 & 3;
- Tuen Mun 18;
- Kwai Shing Circuit;
- Tai Pak Tin Street;
- Tseung Kwan O Area 65B;
- Tung Tau Cottage Area East; and
- Yau Tong Phase 4.



Launching ceremony of Action Seedling Programme in Kai Tak Sites



Action Seedling Programme in Tai Pak Tin Street



Action Seedling Programme in Tseung Kwan O Area 65B

To improve greening of our estates, we actively provided green treatment for newly formed slopes in all our development projects, including Tai Pak Tin Street in Kwai Chung and Tung Tau Cottage Area East during the year.

We took the initiative to incorporate green roofs at high-rise blocks during the design of suitable projects, and we completed a study on the environmental benefits of green roof at two selected residential blocks at Tseung Kwan O Area 73B in October 2013. Some of the recommendations from the study will be incorporated into the Green Design Guide in 2014/15.

To integrate waste management with greening activities, we also carried out a study of using food waste and garden waste to produce suitable gardening compost in the construction site of Hung Shui Kiu Area 13 Phase 3, and have incorporated facilities to turn garden waste into compost in the design of the community planter areas in Kwai Shing Circuit and Tuen Mun Area 54 Site 2.



Compost bin to turn garden waste into compost for the community planter area in Kwai Shing Circuit



Green treatment for a newly formed slope in Tai Pak Tin Street in Kwai Chung

Noise Control

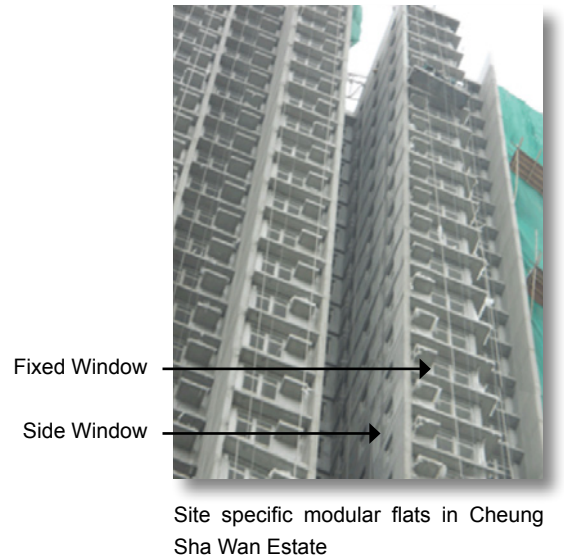
Noise Control During Construction and Demolition

When carrying out construction activities, we require contractors to use Quality Powered Mechanical Equipment for our projects in order to reduce the noise impact to the surrounding. In addition, we encourage contractors to adopt Hydraulic Concrete Crushers (HCC) in demolition works as it generates less noise. The guidelines on the use of HCC have been uploaded onto the Resources Business Partners of our web site.

Control of Road Traffic Noise

In line with our application of passive mitigation measures such as acoustic windows, architectural fins and noise barriers have been carefully applied for various projects design to minimise road traffic noise impacts to our residents.

To address severe noise abatement requirements in some PRH sites, we have adopted innovative approaches in addition to conventional noise mitigation measures. For example, we have devised a site specific flat design, with fixed windows facing traffic noise source and openable side windows for ventilation, in Cheung Sha Wan Estate. We have also installed innovative acoustic balconies in Wing Cheong Estate and acoustic windows in San Po Kong public housing development respectively. Details of our noise mitigation measures can be found in [Case Study 2](#).



Acoustic balcony (left) and acoustic windows (right)

Air Quality Improvement

We have been conducting studies for potential applications of new technologies to improve air quality in the living environment. During the year, we have completed the installation of bio-filtration units using spent mushroom compost in Cheung Sha Wan Estate and are now assessing its performance in reducing vehicular pollutants from the carpark and public road.

In line with the Government's initiative of promoting the use of electric vehicle for improving the air quality, we have made provisions for electric vehicle charging facilities in indoor carparks of all new estates under design.



Bio-filtration units in Cheung Sha Wan Estate

▲ [Back to top](#)

Initiatives in Existing Housing Estate

Environmentally Responsible Management and Maintenance

Environmental Management System for Estate Services

The HA has always been striving for sustainability in green management practices. Since 2010, our team has started to develop and implement the EMS in accordance with the international standard of ISO 14001 in various estates to guide us to control, measure and improve our day-to-day environmental performance in a systematic approach.

In July 2013, we were delighted to announce that all our PRH estates obtained certifications in accordance with ISO 14001 EMS standard.

To implement the ISO 14001 EMS, we have formulated and implemented relevant green management initiatives and operational guidelines for the aspects of routine cleansing, security, planned maintenance and improvement works in estate management, with an aim to develop a green and sustainable estate community for our tenants. The ISO 14001 certificates is a recognition of all HA estates fulfilling an internationally accredited standard. It is also an indispensable joint effort of residents, Estate Management Advisory Committee members (EMAC) and service contractors.

BEAM Plus

We have selected Kwai Shing West Estate as the pilot existing estate to implement BEAM Plus for Existing Buildings version 1.2, with the target to achieve "Provisional Platinum" rating in second quarter of 2014.

Sustainable Building Index

We have enrolled six estates in the Hong Kong Quality Assurance Agency (HKQAA) Sustainable Building Index (SBI) scheme in 2013/14, and subsequently obtained HKQAA SBI Verified Mark.

In the coming year, a total of 10 estates with about 80 buildings covering majority of the block type designs will be selected for enrollment in the SBI Scheme. Our objectives are to gauge the sustainability performance of different block types, and to analyse results for formulating long-term maintenance and improvement strategy of our PRH estates.

Energy Conservation

ISO 50001 Energy Management System

Since early January 2013, the ISO 50001 EnMS has been implemented in Kwai Shing West Estate, in full compliance with the requirements on the surveillance of energy consumption and energy saving measures. In June 2013, Kwai Shing West Estate was awarded an ISO 50001 certification. It was the first residential estate and the first PRH estate in Hong Kong to receive such recognition.

With the successful experiences gained at Kwai Shing West Estate, we have committed to extend the certification to cover all existing PRH domestic blocks by April of 2015 in two phases.

Phase One comprising 621 blocks at 92 PRH estates has commenced implementation since October 2013 with the award of the certification in August 2014, while Phase Two, comprising 539 blocks at 75 PRH estates, will commence the implementation in April 2014, with certification scheduled in April 2015.

Overall Energy Consumption

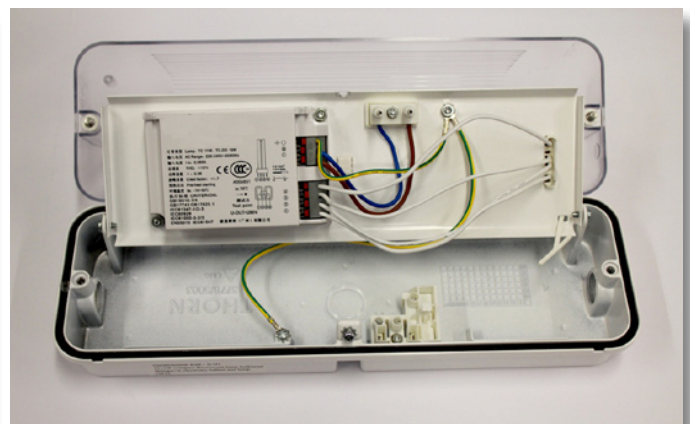
In 2013/14, our electricity consumption in the public areas of PRH blocks was 56.54 kWh per flat per month. Such consumption figure was 4.61% lower than the level recorded in 2012/13.

Adoption of Energy and Carbon Reduction Measures

Since April 2012, we have rolled out a Light Fitting Replacement Programme to replace existing light fitting equipped with electromagnetic ballast by electronic ballast, to enhance efficiency and effectiveness of energy use in PRH estates. In this programme, we anticipate approximately one million light fittings to be replaced in 960 PRH blocks within a period of 42 months. As of March 2014, we had completed the replacement work for some 540 blocks and that for about 280 blocks is planned in 2014/15.



Installation of electronic ballast bulkhead light fitting in Oi Man Estate



Electronic ballast bulkhead light fitting in Kwai Shing West Estate

We have implemented the Lift Modernisation Programme (LMP) since 1989. The programme includes replacement of the aged lift cars, machinery and control system with a view to improving efficiency, riding comfort and accessibility to every floor of the housing block in older estates with additional lift landings. On the energy saving front, these new lifts are more energy efficient by trimming down energy consumption by over 30% when compared with the old ones.

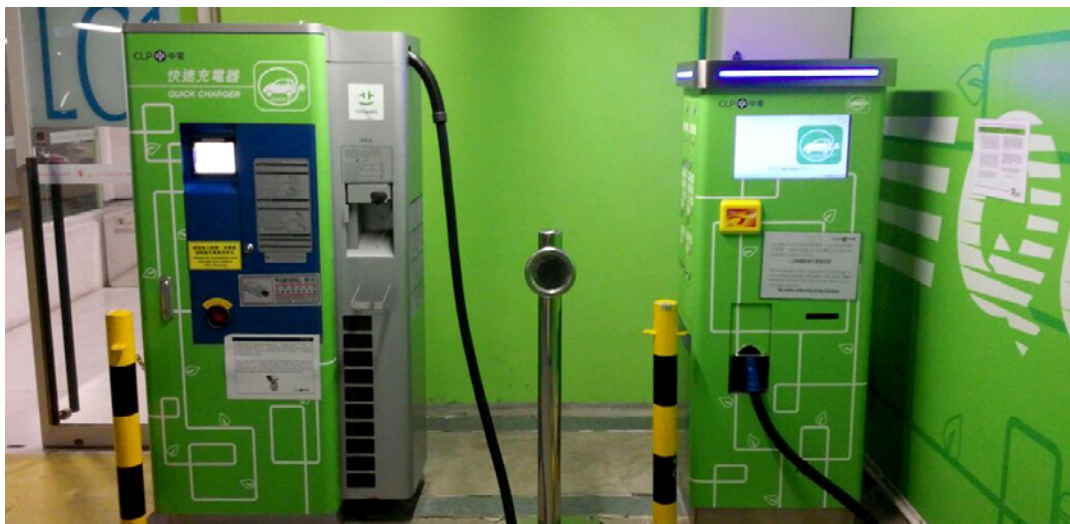
To study the performance of LMP on carbon reduction, verification for its implementation in Fu Shan Estate in accordance with ISO 14064 international standard was conducted in February 2014. A remarkable reduction of 19.7% in carbon emission was achieved in 2012/13 for the three housing blocks at Fu Shan Estate after the implementation of LMP.

We conducted carbon audit for 14 typical PRH block types for monitoring and benchmarking purposes. The overall carbon emissions of the 14 blocks, when comparing with their baseline figures in 2011/12, ranged from -6.75% to +7.25%. Investigations have been undertaken to explore means to reduce carbon emissions. These may include adopting suitable energy saving measures and well planning of housekeeping programme on maintenance and cleansing activities.

For all our shopping centres, we have joined a community-wide Energy Saving Charter to reduce electricity consumption for air-conditioning by maintaining the average indoor temperature between 24 and 26 degree Celsius in summer.

Air Quality Improvement

To support the Government's policy of promoting wider use of electric vehicles (EVs) in the territory for improving air quality, EV charging facilities have been provided either by the China Light & Power Company Limited or Power Assets Holding Limited in several HA's carparks, namely Choi Tak, Kwai Chung, Shui Pin Wai, Yue Wan, Kai Ching Estates and Yau Lai Shopping Centre.



EV charging facilities in the carpark of Yau Lai Shopping Centre

To further promote the use of EVs, we are offering a maximum of two hours free parking during electricity charging in HA's carparks. In future, we will seek opportunities to provide more charging facilities in carparks of our new public housing developments.

Noise Control

We have taken considerable efforts to ensure that noise generated from domestic premises or public places (neighbourhood noise) would not affect our residents. Since 2005/06, we have not received any noise abatement notices from the Government.

Waste Management

We promoted waste separation at source and green management initiatives by implementing the Source Separation of Domestic Waste Programme in all our estates. During the year, we have collected around 29 390 tonnes of waste paper, 1 810 tonnes of plastic bottles, 1 360 tonnes of aluminium cans and 1 050 tonnes of used clothes for recycling in our estates.

Waste Type	Quantity of Waste Collected for Recycling (tonnes)						
	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Paper	14 748	14 194	17 935	21 376	23 849	27 589	29 394
Plastic Bottles	765	939	1 218	1 427	1 584	1 929	1 812
Aluminium Cans	310	496	520	865	1 054	1 133	1 359
Used Clothes	633	618	775	844	945	998	1 053

As at March 2014, all our estates have established collection counters to collect domestic recyclables through incentive scheme.

Since December 2010, a trial scheme on glass bottle recycling has been launched in collaboration with Environmental Protection Department in six PRH estates in East Kowloon Region. The scheme was extended to cover 29 PRH estates in Kowloon East Region in October 2012, and has been under further extension since early 2014, with the target to cover all PRH estates by end 2014, except those at Peng Chau and Cheung Chau.

Trial schemes on food waste recycling have been conducted in PRH estates since December 2011. In 2013/14, the trial scheme covered 14 estates under the “Green Delight in Estates” programme, using off-site food waste recycling (for conversion into fish feed) as well as on-site recycling by micro-organisms. We have also partnered with a green group in setting up a Food Resources Recycling Centre at Lei Muk Shue (II) Estate for trial, with the aim to collect residual food in the estate as food resources for redistributing to people in need. For commercial premises, we encouraged restaurants and supermarkets in the newly built shopping centres and markets to adopt food waste reduction management practices.

To raise environmental awareness of reducing domestic waste among our PRH tenants, we launched a scheme to collect and replant disposed potted New Year citrus plants. The scheme was well received by all public housing estates, with more than 5 000 pots of citrus plants collected.



Collection counter to collect domestic recyclables in Lam Tin Estate



Glass bottle recycling bin



Collection of citrus plants

During the year, we achieved the average domestic waste production of 0.63 kg/person/day from our residents through the implementation of various waste reduction and recovery initiatives in PRH estates.

Greening and Tree Management

Greening and Landscaping

To enhance greening and landscaping in our estates, we have developed community gardens in 10 estates, established two thematic gardens at Lee On Estate and Shun On Estate, and completed the landscape upgrading works in 18 estates in 2013/14.



Thematic gardens at Lee On Estate (left) and Shun On Estate (right)

We also carried out green treatment works for 10 slopes at nine estates by providing planters along slope toe and replacing hard slope surfaces by erosion control mat with hydroseeding and shrubs during the year. In addition, there are 15 green roofs installed at Wo Lok, Fu Shan, Choi Hung, Fuk Loi and Ping Shek Estates, which are well accepted by the residents.

Strengthening Tree Management

Over the years, we have been diligently planting trees in our estates. Our staff members of the Tree Management and Horticulture Sub-section have been working hard to formulate long-term plans and to implement measures for effective execution of tree management and horticulture works in order to enhance and promote greening in the public housing estates.

We estimate that there are over 100 000 trees in our existing estates. In order to properly manage the large number of trees, it is essential to have systematic records in place. Since October 2012, we have been operating a centralised electronic tree database in our Geographic Information System (GIS) to help us manage and update the conditions of our trees. Through using the centralised electronic database, we continued to carry out annual tree risk assessment and inspections for identifying trees that need prompt remedial actions.

We welcome the public to help us maintain proper surveillance on trees. To this end, we have been providing training courses for “Estate Tree Ambassadors” so that they can help us identify problematic trees for immediate follow-up action. As at March 2014, we have recruited some 650 Estate Tree Ambassadors. We have also worked with Development Bureau on tree preservation and management, and on new guidelines and contractual requirements through regular meetings.



Annual tree risk assessment



Training course for Estate Tree Ambassadors

Organising Green Activities

Since 2005, we have been partnering with green groups to launch a long-term community environmental programme, namely the “Green Delight in Estates” (GDE), to carry out estate-wide environmental awareness campaign and in-depth education programme for our residents and tenants.

“Reduction of Municipal Solid Waste” was our theme for GDE Phase 7 in 2013/14 to echo Government’s environmental initiative on waste reduction. During the year, a considerable number of activities had been arranged through this estate-wide activity. These included organising the reducing food waste campaign, food waste recycling and glass bottle recycling programmes, talks, workshops, fun days and site visits.



Second-hand goods exchange activity



Launching ceremony of Phase 7 of the GDE programme



Carnival to deliver waste reduction messages to residents

Our EMAC also plays a vital role in promoting green living environment for our PRH estates. During the year, the EMAC organised a noticeable number of activities, which aimed to increase tenants' awareness and to promote participation in greening of PRH. These activities included tree planting days in 10 estates and greening activities for residents in 20 estates. Apart from the above, all EMACs partnered with non-governmental organisations (NGOs) to organise activities on environmental protection in their estates.



Tree planting day in Lung Hang Estate



Developing community garden in Choi Hung Estate

We further joined hands with the EMACs again in March 2014 to launch the Estate Green Fun Day, in a bid to heighten PRH tenants' awareness of environmental protection and to promote waste reduction and recycling in estates. The message of green living was disseminated through various display panels, environmental videos, game booths and quiz games. The campaign was well received by tenants, children, and elderly in particular.



Estate Green Fun Day in Cheung Hong Estate (left) and Tin Ching Estate (right)

Asbestos Abatement

The Housing Department (HD) has banned the use of asbestos containing building materials since 1984. For the remaining asbestos containing materials in housing estates built before 1984, we have been working with the Environmental Protection Department and Labour Department to carry out a series of safety measures, periodic inspection and monitoring plan as well as special abatement procedures to protect the health of tenants and workers.

During the year, we implemented the asbestos removal works for 5 domestic blocks at So Uk Phase through our estate redevelopment programme. In addition, we carried out asbestos removal works for one factory block at Chai Wan Factory.

We continued to carry out two surveys in a year to monitor the condition of asbestos containing materials in existing PRH estates to ensure that they were in satisfactory conditions. A registered specialist asbestos contractor was also engaged to carry out emergency repair to underground asbestos cement water-mains

Initiatives in Office at Work

Implementation of Environmental Management System

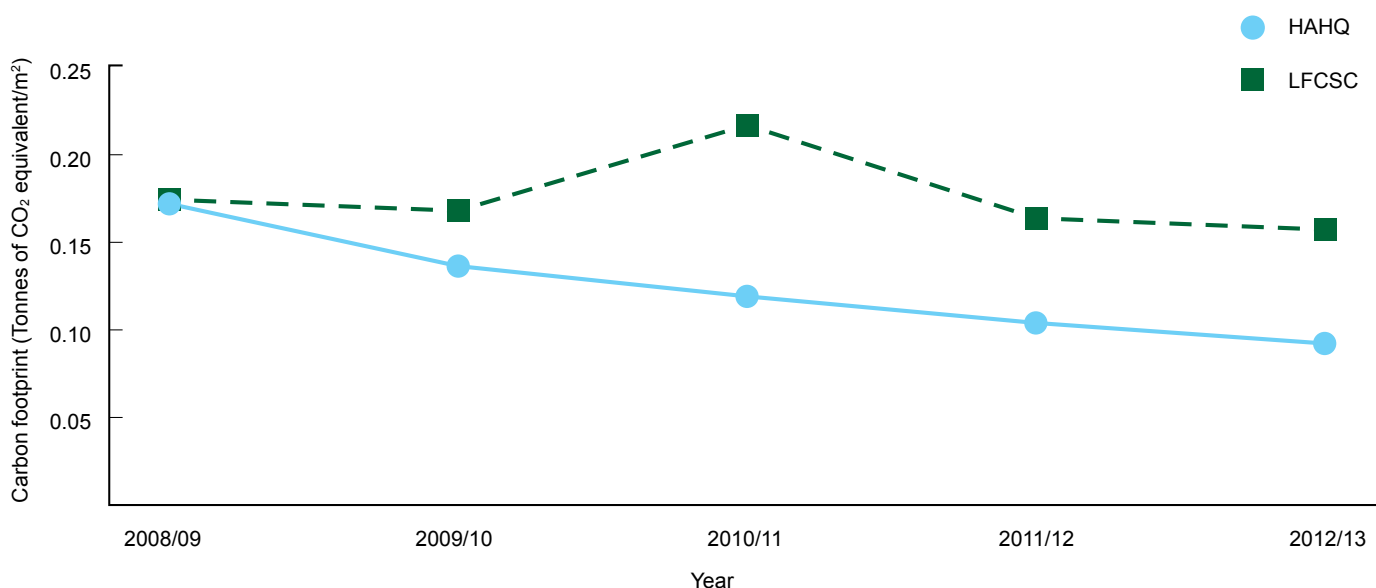
The adoption of an EMS in accordance with the ISO 14001 standard provides us a practical tool for identifying and minimising our environmental impact and improving our environmental performance.

Our Development and Construction Division and Estate Management Division achieved the ISO 14001 certifications in 2009 and 2011 respectively. In addition, our Corporate Services Division was awarded the ISO 14001 certification in December 2013 for the provision of property management functions at the HA Headquarters (HAHQ). Since December 2013, the ISO 14001 EMS has been fully implemented in our Independent Checking Unit, with the target to obtain certification in May 2014.

Carbon Management and Energy Saving

The first carbon audit for Block 3 of HAHQ and Lok Fu Customer Service Centre (LFCSC) was carried out from 1 August 2008 to 31 July 2009. Over the years, we have been undertaking various initiatives targeting to improve our energy performance and reduce our carbon emission, such as timely replacement of defective parts of chiller compressors, adoption of lighting motion sensors, optimisation of daily operation hours and number of air-conditioning equipment, lifts and escalators, etc.

The yearly results of our carbon audits during the period from 2008 to 2013 show a reducing trend of carbon emission which are tabulated below.



Properties	Carbon footprint (Tonnes of CO ₂ equivalent/m ²)				
	1st Year Audit (2008 / 09)	2nd Year Audit (2009 / 10)	3rd Year Audit (2010 / 11)	4th Year Audit (2011 / 12)	5th Year Audit (2012 / 13)
HAHQ	0.170	0.146	0.122	0.110	0.098
LFCSC	0.171	0.168	0.224	0.167	0.161

In 2013/14, our electricity consumption was 34 957 181 kWh, which was decreased by 9.3% as compared to our baseline consumption figure in 2007/08.

Waste Management

We have put continuous effort to reduce paper consumption and implement various waste management initiatives at all HD offices.

During the year, our paper consumption was reduced by 4.0% as compared with the consumption in 2007/08, exceeding our reduction target of 3.5%. All our publicity materials (except sales and marketing publications) are printed with environment-friendly papers.

Our volume of waste paper collection per staff was increased by about 170% as compared with the figure in 2007/08 to 55.6 kg per staff, exceeding our collection target of 20.7 kg per staff.

Besides recycling paper, metal and plastics, we are collecting glass bottles for recycling at our staff canteen. Uncooked leftover food from the staff canteen as well as the leftover food from our annual staff club dinner are collected by a NGO for donation.

To better manage our waste disposal and to minimise the impact of hazardous materials to the environment, we arranged to collect all disposed mercury-containing lamps in HAHQ for special waste treatment during the year.

Water Conservation

Our continuous water consumption monitoring record indicates that water consumption¹ at HAHQ in 2013/14 was 11 404 m³, which was decreased by 25.4% as compared with the figure in 2007/08.

¹ The water consumption does not include the water consumption of HA outstations since we do not have such data collection mechanism currently. We will consider to improve the data collection mechanism and report the data in future.

Environmental Awareness and Green Activities

During the year, we have produced an HA Environmental Corporate Video entitled Public Housing in the Era of Sustainability for publicity, and to provide concise training material for our staff and for public education on the environmental initiatives of HA. Sixty seminars and training courses focusing on subjects of building energy efficiency, environmental monitoring/ measurement, zero carbon building and tree management had been organised for HA staff on regularly basis. Four environmental displays were conducted at HAHQ Green Corner and Lung Cheung Office Block in Wong Tai Sin. We have again organised the HA Staff Environmental Awareness Quiz from August to September 2013, with a set of dedicated web pages for our staff to enter the Quiz anytime during the quiz period.

During the year, we jointly organised with a non-profit making charity organisation, to launch two Environmental Collection and Recycling Campaigns. Our staff members were encouraged to reduce and recycle surplus household items by donating them to those in need. The collection exercise was held at the HAHQ, Lung Cheung Office Block in Wong Tai Sin and the HA Customer Service Centre in Lok Fu. Over 3.2 tonnes of reusable items were collected, including electrical appliances, clothes, shoes, handbags, books, stationeries, toys, kitchen, bedding and sports items, as well as decorations, etc.

To further promote staff awareness of environmental protection, staff members were invited to participate in various external environmental conservation activities such as Hong Kong Tree Planting Day and the Community Chest's Green Day. We have joined Eco Expo Asia 2013 in October 2013 by setting up an exhibition booth to showcase our green performance. We have also participated in the Green Carnival in January 2014 at Kowloon Park by setting up a game booth and display panels to disseminate environmental messages.

Same as previous years, we have joined the annual Hong Kong Flower Show. This year we introduced the landscape design of "Home Sweet Home", reflecting the theme of "Blossoms of Joy", which won the Gold Award for Outstanding Exhibit (Landscape Display) in the Flower Show.



Environmental Collection and Recycling Campaign held at Lung Cheung Office Block in Wong Tai Sin



Hong Kong Tree Planting Day



Eco Expo Asia 2013



HA's landscape design for 2014 Hong Kong Flower Show