Chapter 14

The Environment

The Environment Bureau and the Environmental Protection Department are committed to enhancing the quality of the environment. During the year, the bureau's focus has been on tackling air pollution, implementing a policy framework for managing municipal solid waste, pursuing progressive implementation of the Harbour Area Treatment Scheme, promoting energy efficiency and conservation, and tackling climate change.

Hong Kong, with only 1 104 square kilometres of land, is home to some 7 million people. But it is also one of the world's largest trading economies. Its steep mountains allow it only 225 square kilometres on which to put up buildings for people to live in and to work in. Strict control over urban development is, therefore, imperative. Over 400 square kilometres of the remaining land that is not built on are designated as 'protected areas'. These include country parks, special areas and conservation zones. Inevitably, the heavy concentration of people and activities in a small area strains the environment, particularly the air. Hong Kong is also increasingly affected by air pollution in the Pearl River Delta (PRD) region.

Environmental protection is a major policy area for the third term of the Hong Kong Special Administrative Region Government. The policy initiative is important for the building of a quality city and a quality life for local citizens, as explained by the Chief Executive in his 2008 Policy Address. Tackling air pollution, stepping up action to improve water quality in Victoria Harbour, better managing municipal solid waste, promoting energy efficiency and strengthening further regional co-operation continue to be a Government priority. Through the 'I Love Hong Kong! I Love GREEN!' campaign activities, the public is encouraged to make a change in various aspects of daily living and to nurture a greener and more environment-friendly lifestyle.

Administrative Framework

The Environmental Protection Department (EPD), under the Environment Bureau, has overall responsibility for protecting the environment, which includes nature conservation. It executes environmental policies, vets environmental planning and

assessment findings, enforces and reviews environmental laws, plans and develops facilities for liquid and solid waste disposal, and promotes environmental management, auditing and reporting. It also promotes environmental awareness in the community.

The EPD receives professional support from several government departments and advice from the Advisory Council on the Environment, which comprises 18 members appointed by the Chief Executive, including members from non-governmental environmental organisations, business groups, academic institutions and professional bodies.

The Energy Division of the Environment Bureau oversees Hong Kong's energy policy with a view to providing reliable supplies of energy at reasonable prices, promoting its economical and safe use, and at the same time minimising the environmental impact from energy usage and production.

The Sustainable Development Division, now established under the Environment Bureau, promotes sustainable development in both the Government and the community and provides secretariat support to the Council for Sustainable Development.

Government spending on the environment in 2008-09 was budgeted at $6.99 billion, or about 2.11 per cent of total public expenditure.

Pollution Prevention

The Government has successfully applied an environmental assessment process to policy planning and project proposals. Development and policy proposals submitted to the Executive Council that involve environmental issues and all submissions to the Public Works Subcommittee of the Legislative Council's Finance Committee must contain an assessment of the environmental implications.

Environmental Impact Assessment Ordinance

The Environmental Impact Assessment Ordinance provides a transparent and systematic framework for assessing the environmental impact of designated projects and for identifying mitigating measures if needed. It is supplemented by a technical memorandum setting out clear and consistent technical guidelines and criteria. Since the implementation of the ordinance, 127 environmental impact assessment (EIA) reports have been approved (as at December 31) and more than 1.5 million people and many ecologically sensitive areas are being protected against the effects of unacceptable environmental problems. In addition, the EPD has been promoting continuous public participation in the EIA process.

Environmental Monitoring and Auditing

The environmental monitoring and auditing process seeks to validate the assumptions made in the planning stage of development projects and monitors the effectiveness of mitigation measures to ensure every project meets the environmental performance promised in the impact assessments. In 2008, the EPD handled 119 monitoring and auditing programmes for major projects.

For major projects, permit holders are required to set up dedicated websites to publish the results and data obtained from the environmental monitoring and auditing process. Since 2002, proponents of major projects have been required to set up web camera systems to enable the public to see conditions at their sites.

Land Use Planning

For major land use planning studies, a Strategic Environmental Assessment is required to incorporate environmental considerations into the formulation of land use plans. Under the Environmental Impact Assessment Ordinance, an EIA must be carried out as part of the engineering feasibility study of urban development or redevelopment projects with a study area of more than 20 hectares or involving a population of more than 100 000 people. These environmental assessments are an integral part of the planning studies and help identify major environmental issues and possible mitigation measures for inclusion in the land use plans.

Environmental Management and Sustainability

The Government promotes environmental management in both the public and private sectors through the Green Manager Scheme, environmental auditing, environmental management systems (EMS) and environmental performance reporting. All bureaux and departments have appointed Green Managers, most of whom have regular environmental audit programmes, and some hold ISO 14001 EMS certificates. All bureaux and departments publish annual reports of their environmental performance. Starting from 2007, all annual environmental performance reports incorporate, where appropriate, the principles of the 'Clean Air Charter' which the Government supports to improve Hong Kong's air quality. To further promote environmental performance reporting in the private sector, the EPD has established a dedicated webpage encouraging listed companies in Hong Kong to share their environmental/sustainability information with their stakeholders.

Rural Developments

The Government is committed to improving the quality of life in rural areas and to ending or removing land uses that downgrade the rural environment. The facilities for sewage disposal in the rural areas of the New Territories are also better than before and are still being improved. In 2008, the Government earmarked an additional $10 billion for projects with village sewerage components to provide public sewers to enable domestic discharges from villages in rural and other unsewered areas to be conveyed to sewage treatment works.

Cross-boundary Co-operation

Because environmental pollution transcends administrative boundaries, Hong Kong and Guangdong have been working together on environmental matters for over 20 years.

The Hong Kong Special Administrative Region (HKSAR) Government and the Guangdong Provincial Government have drawn up and taken forward a Regional Air Quality Management Plan that aims to reduce pollutant emissions in the region by 20 per cent to 55 per cent by 2010, taking 1997 as the base year. Since November

2005, a regional air quality monitoring network, comprising 16 monitoring stations, has been publishing the Regional Air Quality Index, and the report on the monitoring results were released on April 30 and October 29, 2008.

Both sides also launched in April 2008 the Cleaner Production Partnership Programme. The purpose is to encourage and help more than 56 000 Hong Kong-owned factories in the PRD region to adopt cleaner production technologies and practices. By improving energy efficiency and reducing emissions, the Hong Kong-owned factories can make a positive contribution to improving the region's air quality.

To strengthen this collaboration further, the Government is charting a course with Guangdong to transform the Pearl River Delta Region into a green and quality living area. Hong Kong and Shenzhen, meanwhile, are jointly implementing action programmes to reduce pollution of the adjoining water bodies, including Deep Bay and Mirs Bay. Both sides are taking forward a joint review of the regional water quality management strategy for Mirs Bay. In addition, the Pearl River Delta water quality model jointly developed by Hong Kong and Guangdong was completed in 2007. The model provides the two governments with a reliable scientific tool for devising management plans and strategies for controlling water pollution in the Pearl River Estuary.

The EPD and the Shenzhen Environmental Protection Bureau also signed a 'Co-operation Agreement on Cleaner Production between Hong Kong and Shenzhen' in November 2008 to strengthen co-operation efforts in this area. Implementation plans will be drawn up to take forward the work.

Climate Change

Climate change has become one of the most important challenges to the international community. The HKSAR Government is doing its best to reduce greenhouse gas emissions by taking vigorous measures, primarily aiming at enhancing energy efficiency and promoting energy conservation to achieve sustainable development. The EPD will prepare for this challenge with the early planning necessary to promote a low carbon economy.

The EPD and the Electrical and Mechanical Services Department launched the first carbon audit guidelines for buildings in Hong Kong in July 2008. The guidelines will assist building managers and users to calculate the amount of greenhouse gas emitted as a result of their building operations so as to explore room for improvements. More than 40 organisations have undertaken to conduct carbon audits on their buildings and to initiate carbon reduction programmes in the coming two years under the 'Green Hong Kong • Carbon Audit' Campaign.

The EPD has commissioned a comprehensive study on climate change to assess its impact on Hong Kong and to identify further adaptation and mitigation measures. It will provide a solid scientific framework for mapping out long-term measures for Hong Kong to combat climate change.

Energy Efficiency

Energy consumption is closely related to greenhouse gas emissions. Improving energy efficiency helps address the growing concerns of climate change and global warming. The total energy consumption at end-use level in Hong Kong in 2006 was 288 158 TJ, with residential, commercial, industrial and the transport sector consuming 18 per cent, 38 per cent, 9 per cent and 35 per cent of the energy respectively. To meet the challenges of climate change and the APEC-wide regional aspirational goal of reducing energy intensity by at least 25 per cent by 2030, the Energy Efficiency Office of the Electrical and Mechanical Services Department has implemented a range of programmes and initiatives to promote efficient use of energy, including implementing a number of voluntary energy efficiency labelling and registration schemes; promoting water-cooled air-conditioning systems and promoting effective energy management methods.

To further promote the use of energy-efficient products, the Energy Efficiency (Labelling of Products) Ordinance was enacted in May 2008, introducing a mandatory energy efficiency labelling scheme. The initial phase covers room air-conditioners, refrigerating appliances and compact fluorescent lamps.

As buildings account for 89 per cent of electricity consumed, promoting their efficient use of energy is instrumental in reducing greenhouse gas emissions. To further improve energy efficiency in new and existing buildings, in March 2008 the Government completed a three-month public consultation exercise on the mandatory implementation of the Building Energy Codes. With the public support received during the consultation, the Government is now preparing the legislative proposal with a view to introducing the relevant legislation into the Legislative Council in 2009.

To promote adoption of energy efficient air-conditioning systems, the Government plans to implement a district cooling system (DCS) at the Kai Tak Development. DCS is a large-scale centralised air-conditioning system that produces chilled water at central chiller plants and distributes it to user buildings for air-conditioning. The system is more energy efficient than traditional air-cooled and water-cooled air-conditioning systems and will reduce electricity consumption and carbon dioxide emissions.

The Government recognises the importance of promoting the use of renewable energy in Hong Kong. In 'A First Sustainable Development Strategy for Hong Kong', the Government set a target of generating 1 to 2 per cent of Hong Kong's total electricity supply from renewable sources by 2012. Meanwhile, Hong Kong's two power companies are making progress in their attempts to use clean energy to produce electricity. Hongkong Electric Company Limited started operating its wind turbine on Lamma Island in 2006. Both companies are conducting Environmental Impact Assessment studies for building off-shore commercial wind farms in Hong Kong waters.

Legislation and Pollution Control

Hong Kong has eight ordinances on pollution control. They are the Waste Disposal Ordinance, the Water Pollution Control Ordinance, the Air Pollution Control Ordinance, the Noise Control Ordinance, the Ozone Layer Protection Ordinance, the Dumping at Sea Ordinance, the Environmental Impact Assessment Ordinance and the Hazardous Chemicals Control Ordinance. Most of them have subsidiary regulations and other statutory provisions such as technical memoranda.

The Government follows a set of environmental quality objectives to better protect public health and to preserve a natural ecosystem. The cost of imposing limits on polluting emissions is not higher than that needed to achieve conservation goals. These goals include making maximum use of the environment's natural capacity to absorb and recycle waste.

In 2008, EPD inspectors made about 50 000 visits to different locations around Hong Kong to enforce controls on air, noise, waste and water pollution and to deal with complaints about pollution. This resulted in some 513 prosecutions and nearly $3.4 million in fines.

The Stockholm Convention on Persistent Organic Pollutants (the Stockholm Convention), became effective to Hong Kong in November 2004 and the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (the Rotterdam Convention) became effective to Hong Kong in August 2008. A local legislation, the Hazardous Chemicals Control Ordinance, came into operation in April 2008 to regulate the import, export, manufacture and use of non-pesticide hazardous chemicals, including those subject to the regulation of the Stockholm Convention and the Rotterdam Convention.

The EPD also works with the construction industry, the catering industry, the vehicle repair industry, the property management sector and other trades to promote good environmental practices and compliance with pollution control regulations.

The EPD runs a Compliance Assistance Centre (CAC) where businesses may obtain updated information and advice on environmental compliance, pollution prevention and environmental management.

Air Pollution

Like most modern cities, Hong Kong's air is affected by pollutants emitted from a multitude of sectors, including transport, power generating and construction. The Government has been implementing various measures to improve air quality. Between 1990 and 2007, emissions of sulphur dioxide (SO_2), nitrogen oxides (NOx), respirable suspended particulates (RSP) and volatile organic compounds (VOC) have dropped by 35 per cent to 55 per cent.

The EPD operates a range of controls under the Air Pollution Control Ordinance (APCO) and its subsidiary regulations, including licensing of some large industrial facilities and specific controls on fuel quality, furnace and chimney installations, dark smoke emissions, open burning, dust emissions from construction works, emissions

from petrol filling stations, and perchloroethylene emissions from dry-cleaning facilities, as well as VOC emissions from printing machines and the levels of VOC in selected products. Furthermore, with effect from October 1, 2008, the law mandates all industrial and commercial processes to use ultra low sulphur diesel (ULSD) to further reduce emissions of SO_2.

The APCO also bans the import and sale of the more dangerous types of asbestos, namely amosite and crocidolite. Moreover, anyone intending to remove asbestos must engage registered professionals, and submit asbestos investigation reports and plans to the department.

Power plants are the largest sources of emission. To ensure smooth, timely and transparent compliance with the emission caps imposed on power plants, the APCO was amended in 2008 to give statutory effects to the emission caps for power plants in 2010 and beyond. The amendments also provide for the local power plants to engage in emissions trading as an alternative means for achieving the emission caps.

The Government commissioned a comprehensive consultancy study in June 2007 to review Hong Kong's Air Quality Objectives and develop a long-term air quality management strategy, taking into account the latest international developments, including the Air Quality Guidelines recently published by the World Health Organisation. It is expected the study will be completed in 2009.

Air pollution is a cause of public concern, especially when the emission sources are near homes. In 2008, the department handled some 14 000 complaints of air pollution, of which some 7 900 were about vehicle emissions, and issued about 1 700 legal notices instructing offenders to abate air pollution.

Transport

Vehicle emissions are the major source of air pollution and nuisance experienced at roadsides. The Government's policy is to apply the most stringent motor vehicle fuel and emission standards whenever they are practicable. Between 1999 and 2008, the concentrations of RSP and NOx, the two major air pollutants at roadsides, fell by 21 per cent and 23 per cent respectively.

Hong Kong largely follows the European Union's standards on emission and fuel. All newly registered vehicles are required to comply with the Euro IV standards, except for newly registered diesel private cars, which must meet emission standards that are even more stringent than the Euro IV standards. Diesel vehicles emit more NOx than petrol vehicles, which is a major contributor to smog.

Nearly all of Hong Kong's taxis are now running on liquefied petroleum gas (LPG) and about 60 per cent of public light buses are fuelled by LPG. To control emissions from older vehicles, the Government has made the installation of emission reduction devices a statutory requirement for all pre-Euro diesel vehicles seeking renewal of their license. This regulation went into force on April 1, 2007. Two new schemes were also launched on the same day to provide financial incentives to encourage early replacement of pre-Euro and Euro I diesel commercial vehicles with new ones compliant with the prevailing emission standards (which is the Euro IV

standards) and the use of environment-friendly private cars. Another incentive scheme was launched on April 1, 2008 to encourage the use of environment-friendly commercial vehicles.

To encourage the supply and use of Euro V diesel, the Government waived the fuel tax for Euro V diesel on July 14, 2008. Euro V diesel is now available at all petrol filling stations in Hong Kong.

Another motor vehicle emission control strategy is to tighten control over smoky vehicles. Under the Smoky Vehicle Control Programme, all vehicles reported must be tested for smoke levels to find out whether the owners have corrected the smoke defects. The number of smoky vehicles on roads has decreased by about 80 per cent since 1999. The Government is also taking forward the proposed statutory ban against idling vehicles with running engines.

Apart from having cleaner vehicles and fuels, it is essential to promote mass transit systems that are pollution-free at street level. The Government has adopted a policy that gives priority to rail over road and encourages innovation wherever practical.

Indoor Air Quality

To promote good indoor air quality (IAQ) and public awareness of its importance, the Government has introduced an IAQ Management Programme, a core element of which is a voluntary IAQ Certification Scheme for offices and public places that are served by mechanical ventilation and air-conditioning systems. It aims to recognise good IAQ management practices and to provide incentives for owners of buildings/premises or property management companies to pursue the best level of indoor air quality.

Ozone Layer Protection

The Montreal Protocol, which aims to control substances that deplete the ozone layer, is applicable to Hong Kong. The Ozone Layer Protection Ordinance prohibits manufacture and import of chlorofluorocarbons and halons for local consumption. The EPD also sets a quota to control the import of hydrochlorofluorocarbons (HCFC). To comply with the accelerated phase-out programme for HCFC under the Montreal Protocol, the Government is planning to ban the import of HCFC products into Hong Kong in phases starting from 2010.

Noise

Road Traffic Noise

Under the existing policy, project proponents are required to assess traffic noise impact when planning new roads and provide necessary direct mitigation measures to ensure traffic noise impacts at the noise sensitive receivers stay within acceptable levels. Where direct measures are inadequate, indirect noise mitigation measures must be used.

To address traffic noise from existing roads, a programme to retrofit noise barriers on noisy road sections is being carried out in phases under the Public Works Programme. All high-speed (70 kilometres per hour or above) roads have been resurfaced with low-noise material wherever practicable. In addition, a trial programme to surface local roads with low-noise material is being implemented.

To prevent individual vehicles from producing excessive noise, the Government tightened legislation in 2002 to require all newly registered vehicles to comply with the latest internationally recognised noise standards.

Railway Noise

Various noise reduction programmes have been implemented by the railway operators since the early 1990s to address noise problems along railways, bringing relief to some 110 000 affected residents thus far. New railway projects are required to undergo environmental impact assessments to ensure their noise impact is properly addressed.

Aircraft Noise

The impact of aircraft noise on almost all residents in the vicinity of Hong Kong International Airport flight paths is within the planning standard. However, there is still concern about the aircraft noise nuisance, especially during evenings and early mornings. The Government will continue exploring and implementing all practicable aircraft noise mitigating measures.

Noise from Industrial or Commercial Activities

Noise from industrial or commercial activities is controlled through the issuance of noise abatement notices. The EPD serves abatement notices requiring the owners/occupants of premises causing excessive noise to reduce it within a given period.

Construction Noise

Noise from general construction works between 7pm and 7am and on public holidays is controlled through construction noise permits. The permits restrict the use of equipment in accordance with strict criteria and ban noisy manual activities in built-up areas. Percussive piling is prohibited at night and on public holidays and requires a permit during the daytime on any day that is not a public holiday.

The Government has phased out the use of noisy diesel, steam and pneumatic piling hammers. The law also requires hand-held percussive breakers and air compressors for construction to meet strict noise standards and to have 'green' noise emission labels.

To deter repeated industrial/commercial and construction noise offences, the Noise Control Ordinance stipulates that the senior management of a body corporate will be held liable for repeated offences committed by their body corporate.

The EPD has introduced a Quality Powered Mechanical Equipment system to promote the use of more environmentally friendly construction equipment and to facilitate the construction noise permit application process.

Intruder Alarm and Neighbourhood Noise

The Police handles complaints about intruder alarms and neighbourhood noise from domestic premises and public places.

Water Quality and Sewerage

Water pollution has increased with urban development and population growth. The lack of proper treatment for most of the sewage from older urban areas around Victoria Harbour resulted in poor water quality there but since the Harbour Area Treatment Scheme (HATS) Stage 1 went into operation at the end of 2001, there has been a marked improvement. The Government is taking steps to implement the second stage of the scheme soon, to ensure that the improvement is sustained.

In addition, pollution control at source has yielded positive results, and river quality has also improved. The percentage of rivers in the 'good' and 'excellent' categories increased from 34 per cent in 1986 to 82 per cent in 2008, and the percentage in the 'bad' and 'very bad' categories fell from 45 per cent in 1986 to 6.4 per cent in 2008.

Sewage Treatment and Disposal

At present, the public sewerage system serves 93 per cent of the population and collects about 2.7 million cubic metres of waste water every day. About 70 per cent of the collected sewage receives chemical or higher levels of treatment before being discharged.

HATS Stage 1 collects sewage from the urban areas of Kowloon, Tsuen Wan, Kwai Tsing, Tseung Kwan O and the northeastern part of Hong Kong Island and transports it through a network of deep tunnels to Stonecutters Island for treatment.

The Government is implementing the second stage in two phases, HATS Stages 2A and 2B. HATS Stage 2A involves extending the deep tunnel system to take the untreated sewage from the remaining parts of Hong Kong Island to the Stonecutters Island Sewage Treatment Works. The treatment plant will be expanded to provide centralised chemical treatment to sewage from the entire HATS catchment with fast-track provision of part of the disinfection facilities in 2009. Design of HATS Stage 2A is now well under way with target for commmissioning of the works in 2014. Under the second phase (HATS Stage 2B), biological treatment facilities will be provided on an adjacent site, the implementation programme being based on the results of a review in 2010-11 of water quality trends and population and sewage flow build-up.

Details of HATS are available on the 'A Clean Harbour for Hong Kong' website, www.cleanharbour.gov.hk.

Apart from HATS, the Government has spent a further $16 billion on other sewerage schemes since 1991 and will spend another $12.8 billion on schemes over the next five years. These include sewerage for rural villages. Under the Water Pollution Control (Sewerage) Regulation, the EPD is empowered to direct house owners to connect their waste water pipes to new public sewers. Since the

regulation came into force at the end of 1995, public sewers have been installed to serve 147 000 people.

Sewage Charges

All water users who discharge their sewage into public sewers have to pay a basic sewage charge in accordance with the polluter-pays principle. Also, 30 trades and industries whose effluent strength exceeds that of domestic sewage, have to pay a trade effluent surcharge reflecting the additional cost of treating their stronger effluent. These charges are used to recover the operation and maintenance costs of sewage collection, treatment, and disposal facilities, while the Government provides funds for construction.

In May 2007, the Government˘s proposals to gradually increase the sewage charge for handling domestic waste water over a 10-year time frame was approved by the legislature. This reflects the community's continued support of the polluter-pays principle and joint commitment in further enhancing the water environment. The average bill for domestic accounts rose from $11 per month in 2007, to $12 per month in 2008, and gradually to $27 per month in 10 years' time. Even after the projected increase Hong Kong's sewage charge will remain among the lowest of the major cities of developed economies.

Livestock Waste Pollution

The Waste Disposal Ordinance bans the keeping of livestock in new towns and environmentally sensitive areas. Where they are allowed, livestock farms must have proper waste treatment systems. The Government provides a free livestock waste collection service which collected about 22 350 tonnes of waste during the year.

From a public health and environmental protection standpoint, livestock farming in urbanised Hong Kong is not sustainable in the long term. To address the problem, the Government has introduced license-surrender schemes to encourage poultry and pig farmers to cease poultry- and pig-keeping permanently. Livestock farmers are given ex gratia payments and the schemes are entirely voluntary. The poultry and pig schemes were introduced in 2005 and 2006 respectively and farmers had up to one year to decide whether or not to join them. The two schemes have effectively decreased the number of pig and poultry farms and reduced the pollution load on the environment. Through the buyout scheme launched in 2008 for the live poultry trade, it is expected that the number of poultry farms will be further reduced.

Bathing Beaches

The Government has adopted strict standards for water quality control to protect the health of swimmers at bathing beaches. These standards indicate the pollution level measured in terms of *E. coli* (the bacterium that can indicate the presence of sewage). The following table shows how beaches were classified in 2008. Beaches in the 'good' and 'fair' categories meet the Government's water quality objective for bathing. In 2008, over 80 per cent of the bathing beaches met the water quality objective.

Beach water quality ranking	Bathing season geometric mean of *E. coli* count per 100ml of beach water	Minor health risk cases per 1 000 swimmers	Number of beaches in 2008
Good	Up to 24	Undetectable	24
Fair	25 to 180	10 or less	10
Poor	181 to 610	11 to 15	7
Very Poor	More than 610	More than 15	0

Beach water quality gradings for open beaches are available on the EPD's home page, hotline and weekly press releases.

Waste Management

Waste Reduction

The Policy Framework for the Management of Municipal Solid Waste (2005-2014), published in 2005, sets out the strategy and measures to address the municipal solid waste problem in Hong Kong over the next decade and proposes simple yet effective economic tools that will create incentives for the community to recycle more and discard less.

Waste reduction and recovery have always played an important role in waste management, resulting in the export of substantial quantities of recovered waste materials for re-manufacturing outside Hong Kong. In all, about 3.12 million tonnes of waste materials, including paper, metals and plastic, were exported in 2008, generating export earnings of about $7 billion.

The Government is also promoting local recycling, with the development of a 20-hectare EcoPark in Tuen Mun Area 38 for exclusive use by the recycling and environmental industry. The EcoPark is being developed in two phases on 8 and 12 hectares of land respectively. Lots in Phase I have been let in batches to waste recyclers since April 2007. Phase II will be commissioned in 2009.

To encourage waste reduction, recovery and recycling, the Government launched a territory-wide Source Separation of Domestic Waste Programme in January 2005, following which domestic waste requiring disposal fell by 4 per cent in 2008 compared to 2007. On the other hand, waste requiring disposal from the commercial and industrial sector continued to increase, rising by 11 per cent in 2008 when compared to 2007. As a result, the Government rolled out a similar programme for the commercial and industrial sectors in October 2007.

In line with the polluter-pays principle, the Government aims to create economic incentives for waste reduction, recovery and recycling by introducing producer responsibility schemes (PRS) and a charging scheme for municipal solid waste. In this

connection, the Product Eco-responsibility Ordinance was enacted in July 2008. It provides the legal basis for introducing PRS in Hong Kong. An environmental levy on plastic shopping bags is the first scheme under the Ordinance. The EPD is also examining the feasibility of introducing PRS for used electrical and electronic equipment. Meanwhile, the EPD continues to promote and support trade-funded voluntary recycling programmes. In addition, it will continue to examine suitable charging options for Hong Kong in respect of municipal solid waste.

Landfills

All municipal solid waste is disposed of at three large modern landfills in the New Territories, which are operated to high environmental standards.

The community disposed of about 9 450 tonnes of municipal solid waste every day in 2008. Of this, 6 080 tonnes was domestic waste and 3 370 tonnes was commercial and industrial waste. On average, each person in Hong Kong disposed of about 1.35 kilogrammes of municipal solid waste daily.

In 2008, it was estimated that the three landfills would be full in early to mid-2010s. Planning work for possible landfill extension schemes is under way.

Hong Kong has 13 old landfills, which have been restored for safety and environmental reasons. Recreational facilities have been or will be built on most of the restored sites.

Refuse Transfer Stations

Municipal solid waste is collected and delivered to refuse transfer stations by refuse collection vehicles and containerised and then taken to landfills by sea or land transport. A network of six modern transfer stations and one set of Outlying Islands Transfer Facilities handles 5 540 tonnes of waste every day. About 79 per cent of Hong Kong's domestic waste is delivered via this network to landfills.

Chemical and Special Wastes

All chemical waste producers are required to pack, label and store their chemical wastes correctly before disposal at licensed treatment facilities. A trip ticket system tracks the movement of chemical waste from its origin to the final disposal point.

In 2008, a daily average of 120 tonnes of chemical waste, including waste from sea-going vessels, was treated at the Chemical Waste Treatment Centre on Tsing Yi Island. A Government contractor operates the treatment centre. Waste producers using its services are required to pay part of the treatment cost.

Following the commissioning of the Low-level Radioactive Waste Storage Facility at Siu A Chau, most of the low-level radioactive waste generated in Hong Kong has been transferred to the facility for long-term storage. The facility is purpose-built to meet stringent international standards for the safe storage of low-level radioactive waste.

Clinical Waste

Upon installation of additional facilities at the Chemical Waste Treatment Centre to receive and dispose of clinical waste and upgrading of the air pollution control system to meet the latest European Union emission standards, the Government will make arrangements for the Centre to receive clinical waste.

Construction Waste

The construction industry generated about 27 580 tonnes of construction waste every day in 2008. Of that, about 90 per cent was suitable for re-use. Our policy has been to maximise the recovery and reuse of inert materials and minimise their disposal at landfills. The construction waste charging scheme introduced in December 2005 provides an economic incentive for reducing construction waste. The Government continues to deliver inert materials to the Mainland for re-use in reclamation projects there.

Large-scale Waste Treatment Facilities

Hong Kong has to deal with a large volume of non-recyclable waste and needs new state-of-the-art, cost-effective facilities to treat such waste and reduce its volume. A multi-technology approach is needed so that wastes of different nature can be dealt with by the most suitable technology. The Government aims to commission the first phase of large-scale Integrated Waste Management Facilities (IWMF) that will adopt advanced incineration as its core technology in the mid-2010s. The Government will also develop Organic Waste Treatment Facilities (OWTF) to treat source-separated organic waste such as food waste and turn it into useful resources. It plans to commission the first phase of OWTF before mid-2010s. However, even with such facilities, residual waste will still need to be disposed of at landfills.

Import and Export of Waste

Import and export of waste are regulated by a permit system under the Waste Disposal Ordinance (WDO). The control is in line with the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, which adopts a prior informed consent procedure for shipments of controlled waste. To support the Basel Ban, an initiative of the Basel Convention to curb the export of hazardous waste from developed countries to developing countries, the EPD has ceased issuing import permits for controlled waste from the developed countries since 1998. This ban arrangement was also incorporated in the WDO in April 2006.

In 2000, a memorandum of understanding (MoU) was signed between the HKSAR and the Mainland to strengthen the control of hazardous waste movements between the two places. The MoU was subsequently renamed 'Co-operation Arrangement on Control of Waste Movements between the Mainland and HKSAR' in November 2007.

In 2008, 110 prosecutions related to illegal waste import and export activities were completed, with the imposition of fines totalling about $1.2 million and imprisonment sentences of between two and five months. Most of the offences

involved trans-shipment of hazardous electronic waste through Hong Kong to other places.

Floating Refuse in the Harbour

The Marine Department deploys a fleet of about 70 contractors' vessels to collect floating refuse and refuse from vessels. In 2008, 17 166 tonnes were collected. Besides law enforcement, the Government also uses publicity and education to tackle the floating refuse problem.

Marine Dumping

The EPD maintains strict control over marine dumping operations via a permit system under the Dumping at Sea Ordinance. These operations follow the requirements of the London Convention to which Hong Kong is a Contracting Party.

Since August 2008, all marine dumping vessels operating under permits issued by EPD have to be equipped with an automatic self-monitoring device that transmits real-time data to the EPD Control Centre to allow the authorities to trace any illegal dumping in a cost-effective manner. Moreover, the department's inspectors conduct frequently patrols of Hong Kong waters to prevent illegal dumping.

Monitoring and Investigation

Assessing the progress made in achieving policy goals is one of the EPD's key activities. The results gained from routine monitoring and special investigations form the basis for much of the department's strategic planning, provision of facilities and statutory controls. The department has 94 sampling stations in marine waters including enclosed bays and typhoon shelters, and another 82 stations for inland waters. It also monitors 41 bathing beaches.

The water quality monitoring programme provides a comprehensive record of the physiochemical and microbiological condition of Hong Kong waters. Annual reports of monitoring data are available on the EPD's website. Water quality of the major marine and river stations is published monthly on the website and gradings of water quality of bathing beaches are published weekly in the media and updated daily on the department's website.

Sustainable Development

The Council for Sustainable Development was appointed by the Chief Executive in March 2003 to promote sustainable development in Hong Kong. The Council has so far addressed five key sustainability issues — solid waste management, renewable energy, urban living space, population policy and better air quality — since launching its first public engagement exercise to consult stakeholders in 2004.

The Council conducted a public engagement process on air quality from June to October 2007, and submitted a report with recommendations on the way forward to the Government in early 2008. The Government later released its response to the Council's Report on the Better Air Quality Engagement Process. It fully agrees with the Council that a holistic and comprehensive approach is required to combat air pollution. To this end, the Government is reviewing Hong Kong's Air Quality

Objectives and developing a long-term air quality management strategy to help protect the health of the public from the effects of air pollution. The review is expected to be completed in 2009.

The Council has invited six rounds of applications from organisations and individuals for grants from the Sustainable Development Fund since 2003 to carry out work related to sustainable development. Twenty-six projects were approved in the first five rounds, involving grants of $21.8 million, and 16 of them have been completed so far.

To facilitate the integration of sustainability considerations in the decision-making process, since 2002 the Government has adopted a sustainability assessment system, the implementation of which is overseen by the Sustainable Development Division. All bureaux and departments are required to conduct sustainability assessments of their major initiatives and programmes and to explain the implications in their submissions to the Policy Committee and Executive Council.

Government Laboratory

The Government Laboratory supports the enforcement of environmental protection legislation and the implementation of various environmental programmes through the provision of comprehensive analytical and advisory services. In 2008, it conducted numerous tests on environmental samples of air, water, sediment, soil, biota and waste samples and other substances, providing a large volume of useful data for various environmental programmes. Preparations have been made for biodiesel testing, a new analytical service to be provided starting from 2009.

Flora

Hong Kong is situated near the northern boundary of the distribution of tropical Southeast Asian flora, sharing similar species and structure with the flora of Guangdong province. Despite its small size, Hong Kong has a rich flora with about 3 100 species of vascular plants, of which 2 100 are native to Hong Kong. Continual efforts in afforestation coupled with various conservation measures have transformed formerly bare hillsides and slopes into impressive woodlands. Besides greening and beautifying the countryside, woodlands are important habitats for wildlife and are essential to protecting water catchments from soil erosion. They also provide recreational opportunities for the public.

Remnants of the original forest cover, either scrub forest or well-developed woodlands, are still found in steep ravines or behind traditional villages in rural areas. They have survived as a result of their location in precipitous topography and the moist winter micro-climate, or because they are protected for cultural reasons.

Terrestrial Fauna

Hong Kong's climate and physical environment provide a wide range of habitats and support for a rich and varied fauna which include about 480 species of birds, 56 species of mammals, over 100 species of amphibians and reptiles, 230 species of butterflies and 110 species of dragonflies.

The Mai Po Marshes form one of the most important wildlife conservation sites in Hong Kong. Together with the Inner Deep Bay area, the Mai Po Marshes area has been listed as a 'Wetland of International Importance' under the Ramsar Convention. About 1 500 hectares of mudflats, fish ponds, marshes, reedbeds and dwarf mangroves provide a rich habitat for migratory and resident birds, particularly ducks and waders. Some 370 species of birds have been observed in this area. Many of these are considered globally threatened and endangered, such as the black-faced spoonbill, oriental stork, Nordmann's greenshank and Saunders's gull. The Agriculture, Fisheries and Conservation Department (AFCD) implements a wetland conservation and management plan to conserve the ecological value of the area.

The traditional fung shui woods near old villages and temples and the secondary forests provide important habitats for many woodland birds. Birds sighted in the wooded areas include warblers, flycatchers, robins, bulbuls and tits.

Areas around the Kowloon reservoirs are inhabited by monkeys which were released or which have escaped from captivity, and their offspring. There are breeding groups of rhesus macaques and a few long-tailed macaques, and their hybrids there. Some rhesus macaques have migrated to the forested areas of Shing Mun Reservoir and Tai Po Kau. Feeding of monkeys has been prohibited since July 1999 to prevent their growth in numbers. Other mammals such as red muntjacs, leopard cats, East Asian porcupines, Chinese ferret badgers, masked palm civets, small Indian civets and Eurasian wild pigs are quite common in the countryside. Bats including the Himalayan leaf-nosed bat, pomona leaf-nosed bats and Chinese horseshoe bat are found in caves and water tunnels. Sightings of less common species such as Eurasian otters, small Asian mongooses and Chinese pangolins are reported occasionally.

Hong Kong has over 100 species of amphibians and reptiles. There are 24 species of amphibians, and three of them — the Hong Kong cascade frog, the Hong Kong newt and the Romer's tree frog — are protected under the Wild Animals Protection Ordinance. Most of the 52 species of snakes are harmless, and reports of people being bitten by highly venomous snakes are very rare. Among the 10 native species of chelonians, the green turtle is of particular interest as it is the only known species of sea turtle breeding in Hong Kong.

Marine Fauna

Hong Kong's subtropical marine environment supports species of both tropical and temperate climates. Local waters contain a wide diversity of fish, crustaceans, molluscs and other marine life, of which at least 150 species are of fisheries significance.

Situated on the eastern bank of the Pearl River estuary, Hong Kong receives fresh water from the river, especially in its western waters. The waters on the eastern side, on the other hand, are little influenced by the Pearl River outflow and are predominantly oceanic in nature. This unusual hydrography helps to contribute to the diversity of marine life.

Despite being close to the northern geographic limit for the growth of hard corals, Hong Kong supports 84 hard coral species. This diversity of corals is quite rich by international standards. A variety of marine fish also breeds in Hong Kong waters. Typical of the eastern waters is the red pargo, one of several sea bream varieties whose fry are abundant along the shore of Mirs Bay in early spring.

Two marine mammal species can be found throughout the year. The Indo-Pacific humpback dolphin, also known as the Chinese white dolphin, is the best known. The other is the finless porpoise. The humpback dolphin prefers the estuarine environment and inhabits the western waters of Hong Kong while the finless porpoise lives in the eastern and southern part, where the waters are predominantly oceanic.

To enhance inshore marine resources, the AFCD has installed artificial reefs to improve fisheries resources and biodiversity. The Marine Parks programme continues to be important for protecting and conserving sites of special ecological and conservation value.

Legislation and Nature Conservation

The Director of Agriculture, Fisheries and Conservation, who is also the Country and Marine Parks Authority, is responsible for the conservation of terrestrial and marine ecological resources and for the enforcement of legislation on nature conservation issues.

The Forests and Countryside Ordinance provides for the general protection of trees and vegetation. Its subsidiary legislation, Forestry Regulations, controls the selling and possession of certain attractive plants to deter illegal hoarding. These include native camellias, magnolias, orchids, azaleas and the Chinese New Year flower.

The Wild Animals Protection Ordinance prohibits the hunting and sale or export of protected wild animals found in Hong Kong. It also restricts entry into three important wildlife habitats that are designated as 'restricted areas'. These are the Mai Po Marshes, the Yim Tso Ha Egretry and the green turtle nesting beach at Sham Wan.

The Protection of Endangered Species of Animals and Plants Ordinance imposes controls on the import, introduction from the sea, export, re-export and possession of endangered species to prevent their over-exploitation.

The Country Parks Ordinance provides for the designation, control and management of country parks and special areas for nature conservation, education and scientific research purposes. Country parks may be used for compatible recreation and tourism purposes.

The Marine Parks Ordinance provides for the designation, protection and management of marine parks and marine reserves for nature conservation, education and scientific research purposes. Recreational activities such as swimming and diving are allowed in marine parks.

The Fisheries Protection Ordinance provides for the regulation of fishing practices and the prevention of destructive fishing activities such as those involving the use of explosives or toxic substances to catch fish.

Protected Areas

In 2008, Lantau North (Extension) Country Park was opened, bringing to 24 the number of country parks in Hong Kong. There are also 17 special areas (six of which are located outside country parks). These comprise a total area of 44 004 hectares (about 40 per cent of the total land area of Hong Kong) that are protected areas. They contain scenic hills, woodlands, reservoirs, islands, indented coastlines, marshes and uplands. All are carefully protected for nature conservation, education and scientific studies. Management responsibilities include the protection of woodland and vegetation against fire, control of development, tree planting, litter collection, the provision of educational and recreational facilities, and the promotion of a better understanding of the countryside.

There are four marine parks and one marine reserve covering 2 430 hectares of scenic coastal areas, seascapes and important biological habitats. Marine reserves are dedicated to conservation, education and scientific studies. Fishing in marine parks is controlled through a permit system while such activity is totally banned in marine reserves. Publicity and educational activities are organised for students and members of the public.

Besides designating the abovementioned protected areas, the Government has been identifying and conserving sites of special scientific interest (SSSI), such as areas with special geological features and natural habitats of rare plants or animals, by exercising strict land use planning and development controls. There are 67 sites listed in the SSSI register.

Topography and Geology

Hong Kong's natural terrain is characterised by rugged uplands flanked by steep slopes. The highest point is Tai Mo Shan (957 metres above Principal Datum) in the central New Territories, and the lowest point (66 metres below Principal Datum) is in Lo Chau Mun (the Beaufort Channel) to the north of Po Toi Island. The mountains are predominantly formed of volcanic rocks, whereas the lower hills are mainly formed of granite. Low-lying areas are generally underlain by granite or sedimentary rocks. A layer of soft, weathered rock covers the bedrock in most places, slope debris mantles the natural hillsides, and alluvium fills many of the valleys. Offshore, the seabed is covered with marine mud, with sand sheets occurring near the coast and in channels.

The oldest exposed rocks in Hong Kong are composed of Devonian river sediments that were deposited approximately 400 million years ago. The region was subsequently inundated by a shallow sea, which deposited Carboniferous limestones, the parent material of the Yuen Long and Ma On Shan marble. Between 170 and 140 million years ago, during the Jurassic and Cretaceous periods, Hong Kong was the scene of violent volcanic activity that deposited thick ash and lava layers. These

eruptions were associated with the development of several calderas (giant craters). At deeper levels, molten magma was intruded and slowly crystallised to form granite. Igneous activity ceased 60 million years ago. Layered rocks now seen on the island of Ping Chau are younger sediments, laid down in a lake on the edge of a desert.

During the last two million years, the Quaternary Period, several major glaciations affected the polar regions. These caused successive lowering of world sea level of up to 120 metres, which resulted in the coastline being about 120 kilometres to the south. During the interglacial periods, such as the present time, global sea level rose and marine sediments were deposited.

Information about the geology of Hong Kong is presented in a series of fifteen 1:20 000-scale geological maps and six accompanying geological memoirs that were produced by the Hong Kong Geological Survey, a part of the Geotechnical Engineering Office. The Hong Kong Geological Survey has also published two summary memoirs and a set of 1:100 000-scale geological and thematic maps that synthesise the geology of Hong Kong. The detailed geological information is also available at the web-site of the Civil Engineering and Development Department.

Energy

Gas

Town gas and liquefied petroleum gas (LPG) are the main types of fuel gas used in Hong Kong for domestic, commercial and industrial purposes. LPG is also used as a fuel by some taxis and light buses while natural gas is used for electricity generation and production of town gas.

Hong Kong has about 2.3 million gas customers in the domestic, commercial and industrial sectors, of which town gas and LPG respectively accounted for 83 and 17 per cent of the total fuel gas sold in these sectors.

Town gas is manufactured at plants in Tai Po and Ma Tau Kok, which have daily throughput capacities of 9.66 and 2.6 million cubic metres respectively. There is a piping network of some 3 300 kilometres supplying town gas to about 1.6 million customers.

LPG is imported into Hong Kong by sea and stored at five terminals on Tsing Yi Island before being distributed to approximately 664 000 customers and 58 LPG filling stations.

Natural gas is imported from the Mainland via submarine pipelines to the Black Point, Castle Peak and Lamma Power Stations for electricity generation and to Tai Po plant for production of town gas.

On August 28, 2008, the Hong Kong SAR Government and the National Energy Administration signed the Memorandum of Understanding (MoU) on the enhanced supply of natural gas to Hong Kong, among other things, in the coming two decades. According to the MoU, the Central People's Government (CPG) supported China National Offshore Oil Corporation's renewal of its supply agreement with

Hong Kong for a further term of 20 years. It was also agreed in principle that the feasibility of supplying natural gas to Hong Kong via a Second West-East Natural Gas Pipeline will be studied, and that the CPG would jointly build with Hong Kong a liquefied natural gas terminal on the Mainland to supply natural gas to Hong Kong. The future level of gas supply to Hong Kong would, as a result, be over and above the current level, and Hong Kong can also benefit from improved air quality by increasing the use of clean energy and reducing the emission of power plants.

The Gas Safety Ordinance regulates the importation, manufacture, storage, transport, supply and use of fuel gas. All gas supply companies, gas installers and contractors must be registered with the Gas Authority (the Director of Electrical and Mechanical Services).

Electricity

The Hongkong Electric Company Limited (HEC) supplies electricity to Hong Kong Island and the neighbouring islands of Ap Lei Chau and Lamma, while CLP Power Hong Kong Limited (CLP Power) supplies Kowloon and the New Territories, including Lantau and several other outlying islands. The electricity supply to consumers is 50 hertz alternating current while the voltage is 220 volts single-phase and 380 volts three-phase.

Both power companies are investor-owned. The Government monitors them through mutually agreed Scheme of Control Agreements (SCAs). These require the companies to seek the Government's approval for certain aspects of their development plans, including their projected basic tariff levels. The SCAs do not give the companies any exclusive rights. They are not franchises, nor do they define a supply area for either company, or exclude newcomers to the market.

The Government signed the new post-2008 SCAs with each of the two power companies in January 2008. The new agreements took effect upon the expiry of the previous ones on 30 September 2008 and 31 December 2008 for CLP Power and HEC respectively. The new SCAs are of ten-year term, with an option exercisable by the Government to extend for five more years, i.e. until 2023, after review of the prevailing market conditions. The permitted rate of return of the power companies has been reduced from 13.5 to 15 per cent on their average net fixed assets to 9.99 per cent, to bring a material reduction in basic tariffs and ease consumers' spending on their electricity bills. The permitted rate of return is also linked to the emission performance of the power companies in the interest of better environmental protection. With the new SCAs in place, there will be continued supply of reliable, safe and efficient electricity at reasonable prices. The Government will proceed with the preparation for the opening up of the electricity market, including the formulation of a new market mechanism and the associated regulatory framework, in the next regulatory period (i.e. from 2008 to 2018).

Currently, HEC has a total installed capacity of 3 756 megawatts (MW) at its Lamma Power Station. The Castle Peak Power Company Limited (CAPCO) supplies electricity to CLP Power from its power stations at Black Point (2 500MW), Castle Peak (4 108MW) and Penny's Bay (300MW).

CLP Power and HEC own their respective transmission and distribution systems. The two transmission systems are interconnected by a cross-harbour link, which provides emergency back-up and some sharing of generating capacity reserve between the two systems. The link has a current total capacity of 720 megavolt-amperes (MVA).

CLP Power's transmission system is also connected to the electricity network in Guangdong Province which facilitates the export and import of electricity to and from the province. The electricity sold to Guangdong is from CLP Power's existing reserve generating capacity. Its sale is governed by an agreement with the HKSAR Government under which CLP Power's consumers are given priority of supply and 80 per cent of the profit from the sales. At the same time, CLP Power buys about 70 per cent of the power generated by the Guangdong Nuclear Power Station at Daya Bay, which has two 984MW pressurised water reactors, to meet part of the longer-term demand for electricity in its supply area.

According to the MoU signed between the Hong Kong SAR Government and the National Energy Administration on 28 August 2008, CPG supported the China Guangdong Nuclear Power Holding Co Ltd in the renewal of its supply agreement with Hong Kong for a further term of 20 years. The quantity of electricity supply will be no less than the current level in principle.

CLP Power also has the right to use up to 50 per cent of the 1 200MW capacity of Phase 1 of the Guangzhou Pumped Storage Power Station at Conghua. Off-peak period electricity from the CAPCO system and the Guangdong Nuclear Power Station is stored in the pumped storage power station, which generates hydro-electricity to meet Hong Kong's demand during peak periods.

There are regulations under the Electricity Ordinance governing the registration of electrical contractors and workers and competent persons, safety of electrical wiring, supply of safe household electrical products as well as protection of electricity supply lines from third party damage.

Climate

Hong Kong has a sub-tropical climate. About 80 per cent of the annual rainfall occurs between May and September. August is the wettest month while January is the driest.

November and December are generally regarded as the best months of the year with pleasant breezes, plenty of sunshine and comfortable temperatures.

January and February are cloudier, with occasional cold fronts bringing in cold northerly winds. Temperatures may drop below 10 degrees Celsius in urban areas.

March and April may be mild and pleasant but humid with occasional fog. From May to August, it is hot and humid with occasional showers and thunderstorms. Afternoon temperatures often exceed 31 degrees.

Tropical cyclones usually affect Hong Kong between June and October. The close approach of tropical cyclones could bring high winds and widespread heavy

rain. Landslips and flooding sometimes cause considerably more damage than the winds.

The Year's Weather

2008 was exceptional in terms of weather in Hong Kong. The territory experienced the longest cold spell in 40 years from late January to mid-February during which the daily minimum temperature remained below 12 degrees for 24 consecutive days. June 2008 registered a record 1 346 millimetres of rain. Hong Kong also experienced the warmest October in 125 years.

The typhoon season started in mid-April, much earlier than usual. Of the six tropical cyclones which affected Hong Kong, four required the No. 8 Gale or Storm Signal to be hoisted.

Meteorological Services

Hong Kong Observatory

Established in 1883, the Hong Kong Observatory provides a wide range of meteorological, geophysical, oceanographic, astronomical and climatological services. It also monitors environmental radiation, and administers the official time standard for Hong Kong.

Weather Forecast and Information Service

The observatory issues forecasts and warnings of hazardous weather to the public, as well as to special users which include the shipping, aviation, transport and logistic communities. The observatory also provides a location-specific lightning alert service. During the Beijing 2008 Olympic Games, it provided special weather services for the Equestrian Events held in Hong Kong, and the Hong Kong Olympic windsurfing team in Qingdao. Its very short-range forecasting system provided the Beijing Games with weather information, important to the Games.

The observatory's Airport Meteorological Office provides weather services at the Hong Kong International Airport (HKIA) and for the Hong Kong Flight Information Region. In 2008, it provided about 152 000 flight documents for aircraft departing from HKIA, about 3 per cent more than in 2007. A special-purpose airport thunderstorm and lightning alerting system was also launched.

Weather information is sent through the media, the automatic Dial-a-Weather System and the observatory's website. The observatory's website continues to be one of the most popular government websites. Over 1 400 million page hits were recorded in 2008, an increase of about 30 per cent over 2007. The observatory's meteorologists also hosted regular TV and radio weather programmes and conducted media briefings during adverse weather conditions.

Radiation Measurement and Assessment

The observatory monitors the ambient radiation levels in Hong Kong and radioactivity in air, soil, water and food. In case of a nuclear alert, it will immediately step up radiation monitoring, assess the radiological consequences and provide technical advice to policy bureaux on action to take.

Climatological Service

The observatory provides climatological information to special users. It also studies climate change and the impact of weather and climate on health. It issues annual forecasts of rainfall and tropical cyclones, as well as, seasonal predictions of temperature and rainfall.

Oceanographic Service

The observatory produces an annual tide table for Hong Kong and provides forecasts of wave and swell for mariners as well as warns the public of possible storm surges and tsunamis. It gives advice on oceanographic matters to government departments and the engineering community.

Geophysical Service

The observatory monitors earthquakes in the vicinity of Hong Kong, and earth tremors around the world. Information on significant tremors is issued through the media and the observatory's website. In response to the disastrous Wenchuan earthquake in Sichuan on May 12, it set up a special webpage to provide information about the main shock and aftershocks. The information was also sent to the Hong Kong team carrying out search and rescue operations in Sichuan.

Official Time Standard

The observatory is the official keeper of the Hong Kong Time Standard which is accurate to within fractions of a microsecond per day. It contributes to the determination of Co-ordinated Universal Time. Time checks are available to the public through its Dial-a-Weather System, the internet and local radio stations. The Internet Network Time Service handled more than 600 million checks in 2008, or 33 per cent up on 2007.

Public Education

To promote public awareness of hazardous weather and climate change, the observatory runs an educational programme, consisting of training courses for members of the public and government personnel, exhibitions, scientific lectures, open days and guided tours of the observatory. The observatory's Voluntary Outreach Team on Climate Change gave some 120 talks to schools and organisations in Hong Kong in 2008.

Websites

Environment Bureau: www.enb.gov.hk
Agriculture, Fisheries and Conservation Department: www.afcd.gov.hk
Civil Engineering and Development Department: www.cedd.gov.hk
Environmental Protection Department: www.epd.gov.hk
Electrical and Mechanical Services Department: www.emsd.gov.hk
Council for Sustainable Development: www.susdev.org.hk
Hong Kong Observatory: www.hko.gov.hk and www.weather.gov.hk