

Environmental Performance

The management of environmental issues is complex within the aviation industry. We believe it is our responsibility to examine where our environmental impacts lie and identify areas where we can make improvements. We are committed to playing a full and active part in ensuring that the airline industry develops in a more sustainable way.

Air emissions

Emissions from flight operations, especially during landing and take-off, can affect local air quality. The Hong Kong SAR Government's air pollutant emission inventory shows that aviation contributed 6% of nitrogen oxides (NOx), 3% of carbon monoxide (CO) and 2% of other air pollutants to local levels of air emissions in Hong Kong.

We can assist in improving air quality by maintaining and operating our fleet to the highest standards. We follow an integrated approach to emissions reduction and many of the initiatives that reduce our climate change impact also serve to reduce our other emissions.



On the ground, we identified which of our inefficient vehicles can be replaced with lower emissions alternatives over time, as part of our vehicle replacement strategy. This strategy is being led by our wholly-owned subsidiary, Hong Kong Airport Services (HAS), which has the largest fleet in the Group. HAS is the largest ramp handling company in Hong Kong, serving 44 airlines. Major activities include the operation of aerobridges and passenger steps, loading and unloading of aircraft and the transportation of crew, baggage, cargo and mail. These activities rely on a fleet of 500 motorised (of which 110 are electric) and 2,200 non-motorised items of ground support equipment and over 3,000 staff. They have set a target to achieve a 5% reduction in emissions per air traffic movement (ATM) and report on their GHG emissions. The biggest contributor to their emissions is fuel use.

The replacement strategy at HAS will see all inefficient vehicles being replaced with the latest emission standards (Euro 4 and 5) by 2011. Electric or other sources of power will also be considered, if manufacturers can produce viable alternatives. At the minimum, we will replace vehicles with those meeting the latest standards.

HAS has undertaken a study on building a refuelling station to minimise travelling time and fuel used and conducted "posi-charger" trials on electric tractors; a new, fast charging machine that can reduce battery charging time from 8 to 2 hours. HAS achieved the Clean Air Charter certification for the first time and is introducing two Euro 4

Our environmental management approach

Our Environmental Policy outlines our commitments which include regulatory compliance, effective environmental management throughout our operations, staff education, development of improvement goals and stakeholder engagement.

Our Environmental Affairs Department ensures the implementation of our environmental commitments and works closely with other departments through the Sustainable Development Steering Committee, Climate Change Long Term Action Group, Dragonair Environmental Committee and the Swire Group Environmental Committee. This Department reports directly to the Management Committee level through our Director Corporate Affairs.

buses for staff transportation between terminals and Cathay Pacific City. It plans to expand the scope of real-time task allocation GPS systems to locate equipment, saving staff time and fuel.



Cathay Pacific Catering Services (CPCS), a wholly-owned subsidiary of Cathay Pacific, is one of the largest flight kitchens in the world. It serves 34 airlines in Hong Kong and other locations. Diesel used by highloaders and boilers are the major sources of direct emissions. Currently, all the new highloaders purchased comply with the Euro 4 standard. All trucks undergo regular checks to ensure the engine is operating normally to prevent incomplete burning of fuel. Emissions from boilers are monitored via continuous emission monitors (CEMs) to ensure normal combustion. CPCS only uses ultra-low sulphur diesel.

In 2009, CPCS utilised refrigerant water heaters in the form of heat pump technology, whereby electricity is efficiently used to perform both cooling and heating functions. A steam recovery system was used to recover unused steam to preheat water to reduce diesel consumption.



Vogue Laundry Service is a wholly-owned subsidiary of Cathay Pacific and operates Asia's largest single-site laundry plant. With over 600 staff it provides a comprehensive range of laundering and dry cleaning services serving over 20 airlines and 25 hotels with a daily output of 77.6 tonnes of laundry.

Vogue Laundry is the only laundry company in Hong Kong to attain the Environmental Management System certification ISO 14001 and Occupational Health and Safety System (OHSAS) 18001 accreditation. There are a number of ongoing environmental initiatives and programmes to reduce energy consumption, such as the use of steam, generated by diesel boilers and an efficient steam trap system which is used during the drying, ironing and finishing processes.

Vogue Laundry continues to implement measures to eliminate emissions of perchloroethylene, a volatile organic compound (VOC) that is used as its major dry cleaning solvent. There are nine machines in total that use perchloroethylene in an 18 to 40 kg system. The perchloroethylene machine is an enclosed system and by adding a carbon absorbing agent (active carbon), this eliminates emissions. By 2008, all old machines had been replaced with a fifth generation carbon absorbing system. Perchloroethylene consumption was found to be 11% less in 2009 than in 2008.

In terms of its vehicle fleet, Vogue currently has 30 vehicles in use including 11 Euro 3 and two Euro 4 vehicles. In 2009, a further two pre-Euro vehicles were removed and plans for more fuel-efficient standards are in place for 2010.

Noise management

We endorse the International Civil Aviation Organisation's (ICAO) Balanced Approach to controlling noise hindrance around airports, which focuses on reducing noise at source, regulating land-use around airports, adapting operational procedures and implementing operating restrictions. We have been working with the Hong Kong Civil Aviation Department (CAD) for several years on noise mitigation.

We encourage CAD and other regulators to follow the ICAO principles of the Balanced Approach, particularly for land-use planning and zoning, which avoids noise sensitive buildings such as schools and hospitals being built on the flight path. We continue to work with manufacturers and other airline partners on ways to reduce noise in our aircraft, including upgrades to our fleet.

Compared to the previous year, in 2009, we reduced our fines relating to noise standard infringements at London Heathrow airport by half and received no fines from New York's John F. Kennedy airport. However we continued to receive noise notifications from Frankfurt and Brussels airports.

Managing waste

Minimising hazardous waste

Some of the chemicals that we use are hazardous and their avoidance is dependent on alternatives being available. Halon, for example, used in our fire extinguishing equipment, is ozone depleting but no approved alternative currently exists. We follow industry practice and recycle this equipment.

We follow specific and well established procedures for the handling of hazardous waste. In our engineering and inflight services manuals, we list the types of hazardous chemicals we use, their associated health and safety precautions and use and disposal procedures.

Careful selection of paint used on our aircraft can contribute to reducing hazardous substances. Dragonair switched to a chromate-free primer on its A320/A321 aircraft. Chromate is a heavy metal and considered as toxic and carcinogenic. The Cathay Pacific fleet and remaining Dragonair A330 aircraft will switch in 2010.



Hong Kong Aircraft Engineering Company (HAECO), in which we have a 15% share, provides aeronautical engineering and maintenance services to airlines. Chemical wastes produced include spent lubrication oil, kerosene and battery acid.

All chemical wastes are labelled, collected and disposed of in full compliance with statutory regulations and recycled whenever practicable. Orientation training is provided to all new staff on environmental protection, including the use of Material Safety Data Sheets (MSDS). These provide detailed information on the physical, chemical and physiological properties of a particular chemical and recommended handling procedures.

Hong Kong Aero Engine Services (HAESL), in which HAECO has a 45% share, provides aero engine and component repair services to Cathay Pacific. Chemicals are used during engine repair services such as cleaning agents. HAESL strives to reduce and minimise its overall impact on the environment through its own internal policies and practices, compliance with legislation and guidelines. Training on chemical awareness is provided to all frontline staff, including proper handling and storage of chemicals.

Steps that have been taken to minimise their environmental impact include identifying more environmentally acceptable materials; adopting alternative working practices to reduce or eliminate toxic chemical waste; treating all water used on-site; recycling lubrication and engine oil; and replacing VOC paint with water-based alternatives.

Stripping aircraft paint can also have an impact. In 2009, we used a new generation peroxide stripper instead of phenolic strippers, which contain phenol, across the fleets. The new stripper contains a low concentrate of hydrogen peroxide which is non-toxic. In addition, the peroxide stripper does not contain methylene chloride, a toxic substance, but instead uses "green" solvent benzyl alcohol. Shifting to the peroxide stripper has helped the waste treatment system significantly.

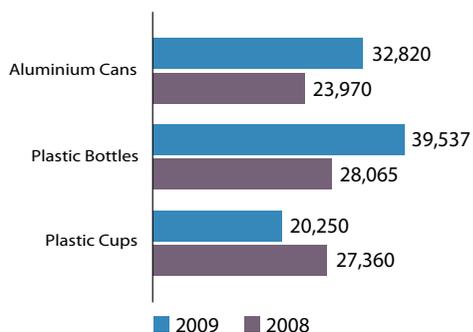
We have moved away from detergent washing to water-only washing, except on Dragonair's V2500 engine fitted to the A320/A321. We will also begin trialling the use of EcoPower, a safe solution to washing engines that does not require toxic chemicals or detergents and is entirely closed-loop where effluent is collected and water is purified for reuse in subsequent washes.

Inflight services – reduce, reuse, recycle

All galley food, newspapers and other wastes in the cabins of inbound aircraft to Hong Kong are collected by our catering division, CPCS. It ensures that inflight magazines and newspapers in good condition are sorted and packed for reuse. All paper waste is stored in a central area within CPCS for subsequent collection by a designated recycler. We also recycle inflight beverage containers, such as aluminium cans and water bottles. Cutlery in economy class is now being reused and recycled at the end of its life.

In 2009, due to the hard work of our cabin crew, we were able to continue our inflight recycling programme on flights to Hong Kong. Dragonair conducted a feasibility study of exploring a similar programme with its caterer and has now implemented a recycling scheme to collect plastic cups and aluminium cans on all inbound flights into Hong Kong. We made efforts to raise awareness amongst our passengers by including an outline of our environmental measures in our inflight Discovery Magazine.

Inflight Waste Recycling (Kg)



Dragonair started inflight recycling on 1 August 2009

We examine ways to use sustainable alternatives to plastic and paper wherever possible. We are actively assessing alternatives to plastic packaging of our inflight magazines and headphones, food packaging and other related items.

Product changes

For all our ultra short-haul economy class flights we removed all aluminium food containers in 2009. Flights to and from Taipei and Manila will see paper containers/bags used for food. On selected long-haul routes, we removed aluminium foils from the breakfast service replacing them with reusable materials. We are looking at streamlining our Asian regional flights to further reduce catering-related weight.

Dealing with food waste

We have been examining ways to reduce leftover food and have developed protocols to load less food on late night flights. We are also planning to prevent the need to throw away certain types of food. Longer term forecasting and better planning gives our caterers more flexibility on what food to provide.

Waste management in our subsidiaries

HAS will be developing a waste management system to be implemented in 2010 across all of its operations. It aims to achieve ISO 14001 certification by 2011. In the meantime, the technical service section, automation and administration sections have been provided with Green Procurement Guidelines based on ISO 14001 principles. HAS has achieved the Wastewise Label for the sixth year running.

Vogue Laundry uses around 2.5 million clothes hangers per year. They encourage customers to return the hangers for reuse and offer a HK\$0.10 per hanger incentive for corporate customers. 62.1% of hangers were reused in 2009.

Jettisons and fuel spills

Fuel jettisons (or fuel dumps) refer to the release of fuel whilst airborne when there is an urgent need to reduce the weight of the aircraft to the maximum landing weight. The dumping of aviation fuel is an extremely rare event. It affects a small number of long-haul flights only when unscheduled landings are required shortly after take-off or due to a diversion to an alternative airport in the event of an inflight emergency. It is recommended that jettisoning fuel should be carried out over the sea, or if this is not possible, above 10,000 feet to allow it to evaporate before it reaches the ground.

Progress against 2009 actions

Consider the feasibility of inflight recyclable items recovery at Dragonair	✓
Continue reducing meal wastage and packaging	✓
Increase awareness of recycling amongst cabin crew and passengers	✓
Assess alternative sources to non-renewable material	ongoing

Agenda for 2010

Streamline our Asian regional flights in terms of services offered to further reduce weight

In such an event, the wake behind the aircraft vaporises most of the fuel into a fine mist which remains in the atmosphere until it is broken down into CO₂ and water by energy generated by the sun. Only a minimal amount of the fuel actually reaches the ground. There were 11 cases of fuel jettisons from Cathay Pacific which led to 507 tonnes of fuel being exited from the aircraft. There were no cases from Dragonair.

Fuel spills refer to the accidental spillage of fuel at airport sites. In 2009, we had four cases of reported spills to regulators at Hong Kong, Melbourne and Amsterdam airports all of which were regarded as minimal risks.

Minimising our water footprint

We now clean and completely seal the aircraft's outer surfaces with a "green" treatment that creates a permanent barrier between the aircraft's outer paint layer and its exposure to the air at altitude. By

reducing the amount of particles which stick to the aircraft and by extending the life of the paintwork, we can reduce exterior cleaning time and defer major re-painting and exterior restoration. This has increased the number of days between each aircraft wash, from 30 to 42. In addition, 7,050 gallons of wax will be saved.

Water taps onboard Dragonair aircraft have been adjusted to reduce the run from 10 seconds to 3 seconds. The same adjustments will be applied to the Cathay Pacific fleet in 2010.

The potable water used for our headquarter buildings at Cathay Pacific City and Dragonair House is supplied by the Hong Kong Government Water Supplies Department. The majority of the potable water is used in our offices, consuming 43,952 m³ in 2009. Wastewater is directed to the Hong Kong Airport Authority's treatment plant prior to discharge. Seawater is used for the air-conditioning systems, supplied by the Airport Authority, and we also make use of excess water from water-

cooled air-conditioning systems for flushing. Both the wastewater and the waste cooling water are tested for compliance with legal requirements.

At Vogue Laundry, one of the most significant environmental challenges is water consumption. A total of 330 million litres of water was used in 2009. Vogue replaced old tunnel washers with Continuous Batch Washing (CBW) systems, which save 3 to 5% of water per kg of linen washed. The water reuse system of the new washers has enabled Vogue to reduce water consumption by 50% since 2003. There are currently four sets of CBW systems in operation which wash and dry one to 1.5 tonnes of linen per hour per system and 24 washing machines in total. 80% of the washing volume is now handled by the CBW systems and in 2009 water consumption was 26% less than in 2008.

At HAS, water management requires a dual approach – responsibly managing water consumption and ensuring the prevention of oil and fuel spilling into drainage systems. HAS continues to prevent water pollution through placing drip trays under electrical vehicles whilst being charged, providing extensive maintenance programmes for all equipment to prevent accidental oil or hydraulic leakage, regularly monitoring hydraulic hoses on ground support equipment and washing vehicles on site during maintenance.

CPCS conducted trials to implement water saving devices in its main plant and washrooms. These devices were able to save 15 to 20% of water compared to normal consumption and they have now been installed in all washrooms.



Optimising the aircraft life-cycle

We are making efforts to reduce the environmental impact of our aircraft at end-of-life by working with members of the Aircraft Fleet Recycling Association (AFRA) in the dismantling process of our retired aircraft. AFRA is recognised as the leading global industry association dedicated to promoting environmental best practice in aircraft disassembly. Salvaging,

recycling and reusing aircraft parts and materials is an important part of this process.

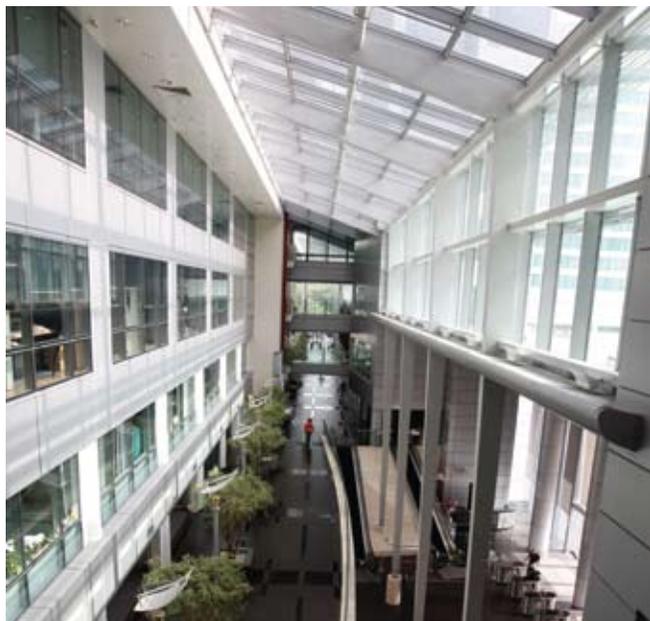
AFRA has set a target to raise the proportion of aircraft material that can be recycled from its current level to 70 to 95% by 2016. Interiors currently make up about 30% of the weight of an aircraft, but very little of the interior is actually recycled. Selected alloys used in aircraft components such as engines can be recovered, melted down and reused by the maker to manufacture new components. We support AFRA's goal and mission, which is the sustainable management of end-of-life airframes and engines.

Progress against 2009 actions

Develop a formal strategy for vehicle replacement across the Cathay Pacific Group	ongoing
Seek new opportunities for collaborating with local business on air quality improvement	✓

Agenda for 2010

HAS to purchase posi-chargers for all electrical vehicles and expand the scope of real-time task allocation GPS system to locate equipment
Vogue Laundry to install a new flash steam recovery system to recover waste steam for use by the boiler to generate hot water. This will achieve a 5% saving in boiler fuel use



Our headquarters

Cathay Pacific City and Dragonair House together cover a total floor area of 193,000 m² and comprise offices, flight training centres, stores, a staff hotel, staff canteens, and other supporting facilities.

The two main environmental concerns for these facilities are energy conservation and waste management. At Cathay Pacific City these are systematically managed through our ISO 14001 certified environmental management system. This was extended to Dragonair House in 2009. We will expand this further to other Cathay Pacific properties.

Cathay Pacific City is equipped with automatic lighting, air-conditioning control systems and motion sensors in conference rooms. In 2009, we installed a solar heat system at Dragonair House and investigated the feasibility of hosting an installation of photovoltaic panels at Cathay Pacific City. In 2009, our electricity consumption increased by around 6% compared to 2008. This increase reflects the expansion of our data centre and equipment requirements in response to business growth, but we will continue to implement measures to reduce its subsequent environmental impacts.

Recycling bins are located at strategic areas in both buildings. In 2008, we identified the opportunity for one department to reduce paper consumption by moving from filing to software solutions and in 2009, it used 50% less paper.

We conduct annual indoor air quality monitoring and received a Good Class level rating for 2009 from the Hong Kong Environmental Protection Department.



Given that both our headquarter buildings are located on Lantau Island, a location considered to be of high biodiversity value, we recognise our responsibility to protect this area by reducing our own environmental impacts. We are also committed to supporting wildlife initiatives elsewhere as highlighted in our partnership work on Pg.24. The key environmental impacts from our headquarter buildings are listed in the Environmental Indicators Table on Pg. 25.

Keeping better track of environmental data

In 2009, we embarked on an ambitious exercise to measure the impact of our business across all our operations, including our wholly owned subsidiaries and all our major outports. We started the process of gathering data on water consumption, energy use, and waste produced and we will report on the findings in our 2010 Report.

We have been tracking environmental data on a regular basis using the Swire Group's Environmental, Health and Safety Database and through our ISO 14001 Environmental Management System, for which Cathay Pacific City was re-accredited in 2009.

The expansion of the data gathering process across all our operations has helped us to identify areas where improvements can be made. Looking ahead, guidance documents for our outport offices on resource use and waste management practices will be developed in 2010 and implemented in 2011.

Progress against 2009 actions

Continue green campaigns at Cathay Pacific City and Dragonair House including further paper recycling and energy saving improvements	✓
Green review of all IT equipment, in particular, data centres at Cathay Pacific City and Dragonair House	ongoing
Investigate expansion of ISO 14001 to other Cathay Pacific Group properties	✓

Agenda for 2010

Develop guidance documents for our outport offices to improve resource use and waste management practices
Develop performance targets for non-GHG environmental data
Track environmental data in our major outports

Partnerships with environmental NGOs

We have been actively participating in a number of initiatives that go beyond our own environmental performance and extend to raising awareness amongst our own staff and the conservation of natural ecosystems. These have ranged from employee volunteering initiatives to partnering with environmental NGOs in Hong Kong and elsewhere.

World Wildlife Fund (WWF)

One of our long standing partnerships has been with WWF, initially in the area of waterbird conservation and more recently in support of their climate change initiatives. As a corporate member, we demonstrated our active support for the Earth Hour campaign. We also implemented a number of other internal initiatives including an inflight entertainment video that highlighted Earth Hour to passengers. We are also working with WWF as part of our staff engagement on biodiversity and conservation issues.

The Climate Group

In 2009, our staff participated in the Hong Kong Carbon Reduction Campaign run by The Climate Group. The campaign aims to catalyse the behaviour of employees towards a low carbon lifestyle, through an educational workshop and a low carbon guidebook and toolkit. 180 of our staff signed up and committed to monitoring their own energy consumption. We also partner with The Climate Group in the AGD Group.

Change for Conservation

Dragonair has partnered with The Nature Conservancy since 2004 on its inflight charity programme to support conservation initiatives in Mainland China. Thanks to the generosity of our passengers, the programme has already raised over HK\$7.4 million as of the end of 2009. Funds collected are being used in watershed protection projects and development of fuel alternatives for local residents in Yunnan.

Other activities

Cathay Pacific staff participated in the annual International Coastal Cleanup initiated by the Ocean Conservancy and, in Hong Kong, managed by the Green Council. It aims to raise awareness and engage



the general public to remove waste and debris from the world's beaches and waterways, to identify the sources of debris, and change behavioural patterns that contribute to pollution. 60 Cathay Pacific volunteers participated in the clean-up of two beaches on Lantau Island where our headquarters is based, and in the space of one hour managed to collect almost one tonne of waste, equivalent to 72 large sacks of waste. In Los Angeles, our outpost staff also supported such an event.

In Cebu, the team organised a beach clean-up in Olango Island Bird Sanctuary with cargo agents. Guest speakers from the Sanctuary conducted briefings on solid waste management and marine conservation. It was the first event of its kind and similar activities will be planned in the future.



Cathay Pacific Holidays offers a full range of leisure holiday choices to more than 60 destinations in China, Asia and beyond. It is in the process of developing a strategy for eco-tourism and is currently studying how to embed environmental initiatives into its package holidays. They will adopt the Cathay Pacific Corporate Code of Conduct and Supplier Code of Conduct and will report on progress in 2010.