

a committed approach



CATHAY PACIFIC AIRWAYS LIMITED

Environmental Report 2003

Cathay Pacific Airways Limited is a Hong Kong based international airline offering scheduled passenger and cargo services to over 80 destinations around the world.

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This report presents Cathay Pacific's environmental management practices, environmental performance and selected passenger and staff initiatives for the calendar year 2003. The report also covers the environmental management practices of key service providers that are partially or wholly owned by Cathay Pacific.

Data for calendar year 2003 is presented in absolute terms and as normalised metrics in terms of capacity (ATK), traffic (RTK) and, in some instances, passenger traffic (RPK)<sup>1</sup> for Cathay Pacific's mainline fleet. Historical data is also presented where available and relevant.

The United Nations Global Reporting Initiative (GRI) Guidelines (June 2002), which provide guidance to organisations preparing sustainability reports, were referred to in the development of the philosophy and structure of this report.

<sup>1</sup> Terminology is presented in the Glossary.

# Chairman's Statement

The aviation industry today faces many challenges, among them the imperative to reconcile the growing demand for air travel with the impact of the industry on the environment. In determining how best to meet this challenge, we need to identify the various ways in which our activities have an impact on the environment, and explore methods of minimising those impacts.

We are committed to an open and transparent approach, so that our operations and their possible implications can be assessed and understood, globally and locally. We are therefore pleased to publish our Environmental Report for 2003, in which we focus on what we believe to be our key environmental challenges.

It is important that our environmental responsibilities are integrated within our overall business strategy, and this is put into context in the early sections of this report. The issues involved are complex, and may involve trade-offs between different impacts in order to identify the best environmental options. The growth that we plan, and our goals for reduced operating costs, must be achieved at the same time as improved environmental performance.

We are able to provide a reasonable overview of our environmental performance in this report, using data collected systematically over a number of years. We are continuing to identify data requirements and, as our systems for data capture become more developed, we will be in a position to establish some focused targets for improvement. At this stage our priority is to extend our data measurement systems for environmental issues and to ensure their robustness. We also intend to develop a comprehensive waste

management strategy for both our flying and ground related operations. Another continuing initiative is the development of the environmental awareness of our staff addressed through annual training and learning plans.

We understand that our stakeholders play an important part in helping us to recognise and prioritise environmental issues. In the preparation of this report we have received constructive feedback from one of our corporate travel partners and an industry financial analyst, who are acknowledged at the end of the report. Dialogue with our stakeholders is something which we will continue to develop and extend as we seek to gain a better understanding of our priorities.

The last year has been a very difficult one for Cathay Pacific, not least because of the dramatic impact on our business caused by the SARS outbreak. No doubt the future will present many more challenges, and as we meet these we remain committed to improving our environmental performance and to reporting regularly upon it.



**James Hughes-Hallett**  
Chairman

## Profile

Cathay Pacific is an international airline registered and based in Hong Kong, offering scheduled passenger and cargo services to over 80 destinations worldwide and connections to over 30 Asian cities. We are also a founding member of the **oneworld** global airline alliance whose combined network serves 135 countries and over 570 destinations worldwide.

Cathay Pacific is a member of the Swire group and is listed on the Hong Kong Stock Exchange. Cathay Pacific's major shareholders are Swire Pacific Limited (46.4%) and CITIC Pacific Limited (25.7%). The ultimate holding company of Swire Pacific Limited is John Swire & Sons Limited, a company incorporated in the United Kingdom.

Cathay Pacific owns, wholly or partially, the following Hong Kong-based subsidiaries and associates:

### Wholly Owned

**Airline Property Limited, Airline Stores Property Limited and Airline Training Property Limited** whose principal activity is property investment in Cathay Pacific City.

**Cathay Pacific Catering Services (HK) Limited** operates one of the world's largest flight kitchens, producing an average of 35,000 meals per day (about 72% of the Hong Kong market).

**Cathay Pacific Loyalty Programmes Limited** manages our frequent flyer programmes as a separate business and acts as a virtual department of Cathay Pacific providing the airline with its Loyalty Marketing Strategy.

**Cathay Pacific Holidays Limited** is Cathay Pacific's tour company and offers tailor-made packages and a comprehensive range of leisure products.

**Vogue Laundry Service Limited** operates Asia's largest single-site laundry plant, providing a comprehensive range of laundering and dry-cleaning services, serving over 20 airlines and 30 hotels with a daily output of 95 metric tonnes.

### Majority Owned

**Global Logistics System (HK) Company Limited (97%)** provides a computer network for interchange of air cargo related information.

**Hong Kong Airport Services Limited (70%)** is the largest ramp handling company in Hong Kong, serving 24 airlines, and holding an exclusive airside busing franchise at Hong Kong International Airport.

**AHK Air Hong Kong Limited (60%)** is a Hong Kong-based all cargo carrier which operates scheduled and non-scheduled services to regional destinations in Asia.

**Abacus Distribution Systems (Hong Kong) Limited (53%)** provides computerized reservation systems and related services.

**Securair Limited (50%)** holds a number of operational service contracts at Hong Kong International Airport. It also offers specialist aviation and security services to airlines and airports worldwide.

### Less than 50% Ownership

**Associated Engineers Limited (34%)** provides repair and maintenance services for ground support equipment and vehicles at Hong Kong International Airport. The company also builds and trades a comprehensive range of airport equipment.

**Hong Kong Aircraft Engineering Company Limited (27%),** or HAECO, is the only full service provider of both line and base maintenance at Hong Kong International Airport and one of the largest aircraft maintenance facilities in Asia.

**Hong Kong Dragon Airlines Limited (19%)** is a Hong Kong-based airline flying to 27 Asia Pacific destinations, including over 15 in Mainland China.

**Hong Kong Air Cargo Terminals Limited (10%),** or Hactl, operates Super Terminal 1 at Hong Kong International Airport. The terminal is the largest and most advanced air cargo facility in the world. Hactl handles 80% of the cargo at Hong Kong International Airport, serving more than 60 international airlines and 900 freight forwarders.

## Cathay Pacific Passenger and Freight Network



## Financial and Operating Highlights 2003

Group Financial Statistics <sup>a</sup>		2003	2002	Change
<b>Results</b>				
Turnover	<i>HK\$ million</i>	29,578	33,090	-10.6%
Profit attributable to shareholders	<i>HK\$ million</i>	1,303	3,983	-67.3%
Earnings per share	<i>HK cents</i>	39.0	119.5	-67.4%
Dividend per share	<i>HK cents</i>	48.0	44.0	+9.1%
Profit margin	<i>%</i>	4.4	12.0	-7.6%pt
<b>Balance Sheet</b>				
Shareholders' funds	<i>HK\$ million</i>	31,052	32,115	-3.3%
Net borrowings	<i>HK\$ million</i>	11,111	9,646	+15.2%
Shareholders' funds per share	<i>HK\$</i>	9.3	9.6	-3.1%
Net debt/equity ratio	<i>Times</i>	0.36	0.30	+0.06 times
<b>Operating Statistics – Cathay Pacific</b>				
Available tonne kilometres ('ATK')	<i>Million</i>	13,355	12,820	+4.2%
Passenger load factor	<i>%</i>	72.2	77.8	-5.6%pt
Passenger yield	<i>HK cents</i>	43.3	45.4	-4.6%
Cargo and mail load factor	<i>%</i>	68.7	71.2	-2.5%pt
Cargo and mail yield	<i>HK\$</i>	1.78	1.80	-1.1%
Cost per ATK	<i>HK\$</i>	2.00	2.13	-6.1%
Cost per ATK without fuel	<i>HK\$</i>	1.61	1.76	-8.5%
Aircraft utilisation	<i>Hours per day</i>	11.4	12.1	-5.8%
On-time performance <sup>b</sup>	<i>%</i>	91.0	90.7	+0.3%pt

<sup>a</sup> 'Group' refers to Cathay Pacific plus its subsidiary and associated companies.

<sup>b</sup> Departure within 15 minutes of scheduled departure time.

## Fleet Profile

Aircraft Type	Number as at 31 Dec 2003				Firm Orders <sup>a</sup>			Expiry of Operating Leases		
	Owned	Leased		Total	'04	'05	Total	'06	'07	'08
		Finance	Operating							
<b>Aircraft Operated by Cathay Pacific:</b>										
B747-400	11	6	2	19					1	1
B747-200F	4	2		6						
B747-400F	1	4		5		1	1			
B777-200	1	4		5						
B777-300		9		9	1					
A330-300		23		23			1			
A340-300		11	4	15				4		
A340-600			3	3					2	1
<b>Total</b>	<b>17</b>	<b>59</b>	<b>9</b>	<b>85</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>3</b>	<b>2</b>
<b>Aircraft Operated by Air Hong Kong Limited:</b>										
B747-200F		1		1						
A300-600F					4	2	6			
A300F/B727F <sup>b</sup>			3	3						
<b>Total</b>		<b>1</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>6</b>			

<sup>a</sup> Subsequent to 31 Dec 2003 additional firm orders of six A330-300's and two B777-300's for delivery 2005 – 2007 have been announced.

<sup>b</sup> Aircraft on wet lease.

### CATHAY PACIFIC AND HONG KONG

We are deeply committed to Hong Kong, where Cathay Pacific was founded in 1946. We continue to make substantial investments to develop Hong Kong's aviation industry and enhance Hong Kong's position as a regional transportation hub. In addition to our fleet of aircraft, these investments include catering, laundry, aircraft maintenance and ground handling companies, as well as our corporate headquarters, Cathay Pacific City, at Hong Kong International Airport (HKIA). Cathay Pacific and its subsidiaries and associates employed some 21,000 staff in Hong Kong in 2003, with Cathay Pacific's Hong Kong-based staff numbering approximately 11,300.

The outbreak of SARS in mid-March 2003 had a significant impact on our passenger business and more widely

on the Hong Kong economy and local tourism. To help the Hong Kong economy overcome the impact of SARS, we took a leading role in initiatives such as the 'We Love Hong Kong' campaign to rebuild confidence and tourism. We donated more than 10,000 tickets to support the Hong Kong Tourism Board's effort to boost local tourism following Hong Kong's removal from the World Health Organisation's list of SARS-affected areas. The winners of the Hong Kong Super Draw took home Cathay Pacific tickets worth HK\$2 million.

In addition, we launched 'I Can Fly', a new community initiative which nurtures a spirit of social service and enthusiasm for aviation among 1,000 local young people. We also made a three-year commitment, with Credit Suisse First Boston, to jointly sponsor the Hong Kong Rugby Sevens tournament, starting in 2004.

This major international event draws tourists from all over the globe and brings financial benefits to large and small businesses.

The resumption of Cathay Pacific flights to Beijing marked an important milestone in our ongoing work to strengthen Hong Kong as a global hub and gateway. This service will enhance the flow of business and tourist traffic to and from Beijing by offering single-carrier through services to and from the Chinese mainland.

# Vision and Strategy

## VISION

We aim to respond to the growth in demand for passenger travel and air cargo by expanding our fleet and further strengthening our global network. At the same time, we recognise that our operations have an environmental impact and that this impact may increase as our business expands. As such, our long-term objective is to mitigate the environmental impact of our operations in absolute terms and improve our environmental performance per unit of capacity operated and traffic carried.

## STRATEGY

We have developed a series of business strategies to achieve our growth plans. The implementation and success of some of these strategies will be directly influenced by our approach to environmental issues.

In the context of intense competition and upward pressure on costs, we must minimise our costs per ATK. Many cost reduction measures have environmental benefits. For example, fuel efficiency not only helps us to manage our second largest operating cost but also to reduce the consumption of non-renewable resources and reduce the emissions that contribute to climate change and affect local air quality.

It is increasingly important to understand how environmental issues such as aircraft noise, local air quality and climate change may affect our future operating costs and influence decisions for purchasing major items such as aircraft and engines. For instance, in response to local communities' concerns about local air quality, some airports in Europe have introduced NO<sub>x</sub> (nitrogen oxides) emission charges. As concerns about aircraft noise continue to grow, this will increasingly influence operational procedures and decisions on fleet types.



Environmental performance also has an impact in terms of customer acceptance. As awareness of environmental issues increases amongst customers, we need to demonstrate our strong environmental performance. For example, some of our major corporate customers request detailed information about our environmental management and performance. For some service sector companies, greenhouse gas emissions from corporate air travel are considered one of their more significant direct environmental impacts.

As aviation markets become more liberalised, we will look to reinforce our position in the Hong Kong passenger and cargo markets and to build our mainland China business further. As low cost carriers begin to emerge on some routes, we will need to review how we sell and market our Economy Class

product in the Asia Pacific region. In general, environmental issues, particularly poor air quality, excessive noise and poor waste disposal practices are still an acute problem in the region. We will need to demonstrate to airport authorities and regulators that Cathay Pacific is a leading airline in all respects, and that we are actively mitigating our environmental impacts at the airports we serve.

# Environmental Commitment and Governance

Cathay Pacific is committed to conducting its business in a manner which fosters the sustainable use of the Earth's resources, minimises as far as commercially practicable any adverse impact on the environment and protects the health and safety of our staff, passengers, business associates and the general public.

## COMMITMENT

We believe that shareholders' long-term returns will be maximised through acting in an environmentally and socially responsible manner and ensuring that the interests of the wider community are represented. Recognising this, we launched our revised Environmental Policy in November 2003.

We intend to develop a series of robust goals for Cathay Pacific

over the next year after further careful consideration of our operations and those of our associated companies, and refinement of our data management systems. Potential areas already identified from internal discussions include the development of a comprehensive waste management strategy, fuel efficiency, greater integration of environmental issues into our purchasing mechanisms and improved staff awareness.

## GOVERNANCE

At Cathay Pacific, we have established an Environmental Steering Group, which has overall responsibility for integrating environmental considerations into our decision-making processes and long-term business planning. The Group is chaired by the Director Corporate Development and comprises senior management from key departments including Purchasing, Business Improvement, Cargo, Engineering, Flight Operations, Inflight Services, Marketing, and Property and Services. The Environmental Steering Group is responsible for undertaking regular reviews of Cathay Pacific's Environmental Policy to ensure that it continually reflects the Company's underlying philosophy and objectives.

To meet the objectives of the Environmental Steering Group, terms of reference have been established as follows:

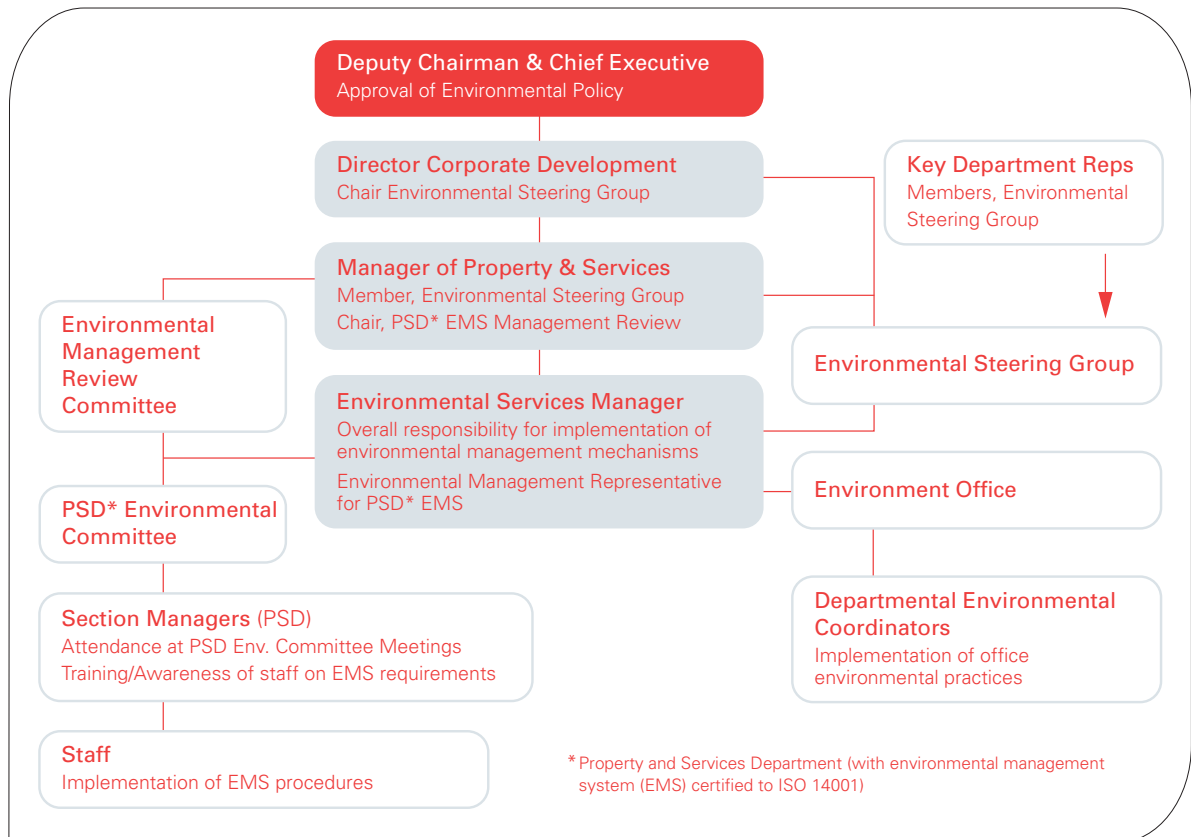
- ▶ To help raise awareness of environmental issues, our environmental responsibilities and commitments among both staff and the community at large.
- ▶ To ensure a coordinated and systematic approach to developing formalised environmental management practices throughout all departments / business groups.
- ▶ To ensure the Environmental Policy is being fully implemented and continues to meet the needs of the company and the communities we operate in.

### Environmental Policy

Cathay Pacific Airways Limited takes its environmental responsibilities seriously. All the Company's decisions, actions and day-to-day operations are undertaken with the environment in mind. Specifically, Cathay Pacific is committed to the following:

- ▶ Compliance with relevant environmental legislation, both local and international.
  - ▶ Effective environmental management throughout all business practices to ensure that all activities and services with the potential to cause environmental impacts are identified and controlled appropriately.
  - ▶ The development of staff education and communication to ensure the implementation of sound environmental practices and a commitment to environmental protection.
- ▶ The implementation of specific measures to prevent pollution, minimise energy and materials consumption and reduce waste at source through 'replace, reduce, reuse and recycle' initiatives.
  - ▶ The incorporation of environmental considerations into the purchasing process, and promoting environmental management and improved environmental performance throughout the supply chain.
  - ▶ The development of challenging environmental improvement goals to ensure the continual improvement of environmental performance.
  - ▶ Close liaison and communication with all stakeholders, including suppliers, customers and local communities, to ensure the needs of external parties are considered in our environmental commitments.

## Environmental Management Organisation



► To provide a platform for suggesting, agreeing, approving and reviewing environmental initiatives and improvement goals.

► To communicate environmental activities of the Environment Office, and communicate external environmental issues of relevance to Cathay Pacific as an airline and a business.

► To ensure customer demands are met, with respect to our environmental commitment and performance.

During 2003, we established a network of environmental co-ordinators in all departments to support forthcoming environmental initiatives. We also held a number of workshops and training sessions to raise the general level of environmental awareness amongst relevant staff groups, and commenced development of a training module to be delivered over our Intranet learning system. As part of this,

we conducted a formal exercise to identify awareness and training needs for environmental issues.

Management of environmental issues is closely aligned with our core operations in terms of resource minimisation and improved fuel efficiency. Whilst a formal environmental management system (EMS) has not been developed for our passenger and cargo services, our property management services received ISO 14001 certification in December 2003. The scope of this certificate includes building and support services at our headquarters, Cathay Pacific City, as well as property planning and project management services for renovation and fit-out works.

We intend to integrate progressively formalised environmental management practices throughout the whole Company and to encourage the implementation of environmental management principles into the operations of our key service providers.

The Swire group has an established group-level Environmental Committee, in which Cathay Pacific and a number of its service providers actively participate. The Committee is supported in its work by two external advisors, one from academia and one from an environmental non-governmental organisation. Eleven companies in the group collate and share information through the Swire Pacific Corporate Environmental, Health and Safety Database, first established in January 2002.

## Key Environmental Issues

The management of environmental issues for the aviation sector is often complex, with legislative requirements varying by country and involving many different regulatory organisations. At Cathay Pacific, many of our aircraft support services are outsourced and our key service providers are responsible for ensuring compliance with relevant environmental legislation and implementing good environmental practices.



This does not mean that we outsource our environmental responsibilities. We are responsible for engaging our service providers on environmental issues and can exert considerable influence, especially over our wholly owned subsidiaries and those in which we have a significant shareholding. We also recognise that airlines have a role to play in some wider issues such as the impact of mass tourism on ecosystems. We will continue to monitor and evaluate such issues and develop initiatives as and when the case for doing so becomes more robust.

Many of our environmental impacts are indirect and we must work closely with our key suppliers to ensure compliance and encourage best practice

A summary of environmental impacts and issues associated with Cathay Pacific and our key service providers is given below.

<b>Cathay Pacific Airways and key subsidiaries</b>	<b>Resource Input</b>	<b>Environmental Impact / Issue</b> (Major & Minor, Direct & Indirect)
<b>Flight Operations</b>	<ul style="list-style-type: none"> <li>▶ Engine oil</li> <li>▶ Jet fuel</li> </ul>	<ul style="list-style-type: none"> <li>▶ Fuel consumption / efficiency</li> <li>▶ Global air emissions / climate change</li> <li>▶ Local air quality emissions</li> <li>▶ Aircraft noise</li> <li>▶ Cabin air quality</li> <li>▶ Impact of mass tourism on ecosystems</li> </ul>
<b>Inflight Services</b>	<ul style="list-style-type: none"> <li>▶ Disposable items</li> <li>▶ Duty free items</li> <li>▶ Food and beverages</li> <li>▶ Inflight reading material</li> <li>▶ Menu cards</li> <li>▶ Catering packaging and equipment</li> </ul>	<ul style="list-style-type: none"> <li>▶ Resource consumption (disposable items)</li> <li>▶ Waste management (food and catering items, magazines and newspapers, plastic and paper packaging)</li> </ul>
<b>Cathay Pacific City</b>	<ul style="list-style-type: none"> <li>▶ Energy</li> <li>▶ Office supplies</li> <li>▶ Maintenance materials</li> <li>▶ Vehicle fuel</li> <li>▶ Water</li> </ul>	<ul style="list-style-type: none"> <li>▶ Energy and water conservation</li> <li>▶ Waste management (including waste paper, plastics, food waste from canteen, toner cartridges, aluminium cans)</li> <li>▶ Waste water</li> <li>▶ Air emissions from ground vehicle fleet</li> </ul>
<b>Cathay Pacific Catering Services</b> (Catering Services)	<ul style="list-style-type: none"> <li>▶ Packaging</li> <li>▶ Reuseable and disposable items</li> <li>▶ Energy</li> <li>▶ Food and beverages</li> <li>▶ Maintenance materials</li> <li>▶ Water</li> <li>▶ Office supplies</li> </ul>	<ul style="list-style-type: none"> <li>▶ Waste management (food waste from flight kitchens, inbound food and beverages, packaging waste, office paper)</li> <li>▶ Waste water</li> <li>▶ Emissions to air / odour</li> <li>▶ Chemical waste management</li> <li>▶ Food containing genetically modified ingredients</li> </ul>
<b>Vogue Laundry</b> (Laundry)	<ul style="list-style-type: none"> <li>▶ Energy</li> <li>▶ Hangers, plastic bags and covers</li> <li>▶ Dry cleaning solvent</li> <li>▶ Vehicle fuel</li> <li>▶ Water</li> <li>▶ Office supplies</li> </ul>	<ul style="list-style-type: none"> <li>▶ Air emissions (perchloroethylene vapour from dry cleaning, vehicular emissions from trucks)</li> <li>▶ Energy and water conservation</li> <li>▶ Waste management (including chemicals)</li> <li>▶ Waste water</li> <li>▶ Fuel consumption</li> </ul>
<b>HAECO / TAECO</b> (Aircraft Maintenance)	<ul style="list-style-type: none"> <li>▶ Jet fuel</li> <li>▶ Engine oil</li> </ul>	<ul style="list-style-type: none"> <li>▶ Energy and water conservation</li> <li>▶ Scrapped materials / aircraft parts</li> </ul>
<b>HAESL</b> (Engine Maintenance)	<ul style="list-style-type: none"> <li>▶ Energy</li> <li>▶ Water</li> <li>▶ Maintenance materials</li> <li>▶ Paint / stripper</li> <li>▶ Office supplies</li> </ul>	<ul style="list-style-type: none"> <li>▶ Emissions to air (including paint fumes)</li> <li>▶ Waste management (including chemicals)</li> <li>▶ Waste water</li> <li>▶ Noise</li> </ul>
<b>HAS</b> (Ramp Handling)	<ul style="list-style-type: none"> <li>▶ Energy (including batteries)</li> <li>▶ Water</li> <li>▶ Vehicle fuel</li> <li>▶ Office supplies</li> </ul>	<ul style="list-style-type: none"> <li>▶ Fuel consumption</li> <li>▶ Emissions to air</li> <li>▶ Waste management (including chemicals)</li> </ul>

# Flight Operations

For passenger and air cargo services, our main concerns are air emissions and the contribution to climate change, impact on local air quality and aircraft noise.



## CLIMATE CHANGE

The climate change impact of aviation arises from carbon dioxide (CO<sub>2</sub>) emissions from aircraft and ground vehicles, together with effects in the upper atmosphere linked to emissions of oxides of nitrogen (NO<sub>x</sub>) and water vapour. The 1999 IPCC *Special Report on Aviation and the Global Atmosphere* outlines the atmospheric effects of aviation and related uncertainties in scientific understanding. It forms a detailed and authoritative basis for examining the impact of aviation on global climate change as measured by the change in the energy balance of the Earth's atmosphere.

The report examined a range of growth scenarios for CO<sub>2</sub> emissions. It is estimated that CO<sub>2</sub> emissions globally from aviation would grow from 0.14 gigatonnes of carbon in 1992 to an increase of between 1.6 and 10 times per year by 2050. Most attention has focused on the reference scenario used by the IPCC. This was based on traffic growth of 3.1% per annum, lower than the historical trend of 5–6% per year, and a fuel burn growth rate

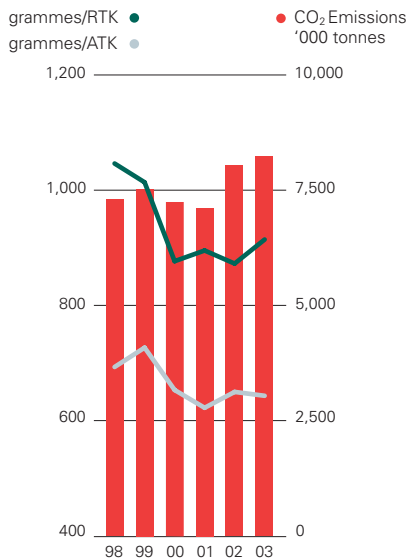
of 1.7% per year. This scenario assumed that global fleet fuel efficiency would continue to improve through a combination of technological and operational improvements. It is estimated that aviation emissions accounted for 3.5% of anthropogenic climate change contribution in 1990 and that this could grow to 5% by 2050 according to the mid-range scenario. However, there is great uncertainty about the climate change impact of non-CO<sub>2</sub> emissions from aircraft and research is ongoing.

The development of mechanisms aimed directly at minimising the climate change effects from aviation is still at an early stage. The 1997 Kyoto Protocol requires that developed nations cut their

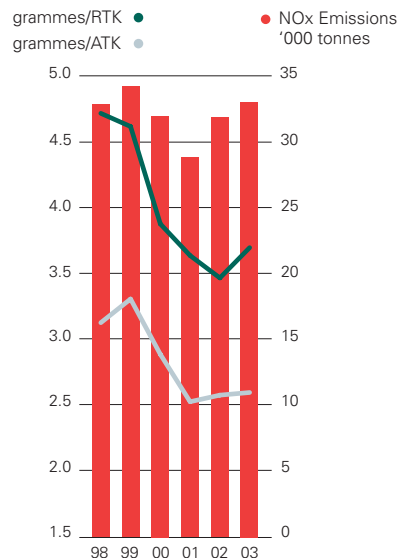
emissions by 5% below 1990 levels by the period 2008–2012. However, emissions from international aviation are not covered by the Kyoto Protocol unlike domestic emissions. As such, signatories to the Protocol (which include China) have tended not to include aviation in their plans to meet their Kyoto targets.

In Europe, discussions are ongoing between airlines and governments about emission reduction mechanisms. Emission trading is emerging as a potential instrument, the rationale being to ensure that emissions reductions take place on an environmentally viable and cost effective basis. In the event that such mechanisms are introduced in Europe, it is likely that they would initially apply only to intra-EU flights,

**CO<sub>2</sub> Emissions from Cathay Pacific Aircraft**



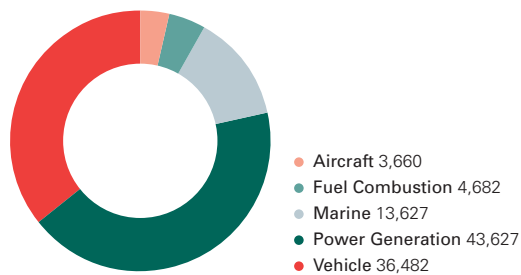
**NO<sub>x</sub> Emissions from Cathay Pacific Aircraft**



## Hong Kong Air Pollutant Emission Inventories (2000)<sup>2</sup>

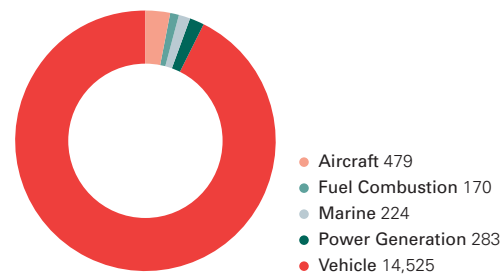
### Nitrogen Oxides

102,078 tonnes



### Non-methane Volatile Organic Compounds

15,681 tonnes



possibly as part of the EU emissions trading scheme. In Asia the climate change debate is less advanced and often a secondary issue to local environmental issues such as air quality and noise. Nonetheless, it seems likely that some form of financial mechanism will be introduced in the medium term for the aviation sector worldwide.

In examining the emissions data for Cathay Pacific aircraft between 1998 and 2003, the increase in CO<sub>2</sub> emissions is a direct reflection of the increase in fuel consumption. The downward trend in CO<sub>2</sub> emissions per RTK and per ATK is due to factors such as the drive towards optimal payload and flight capacity, thereby improving efficiency on a load factor basis.

Unlike CO<sub>2</sub> emissions, NO<sub>x</sub> emissions are not directly related to fuel consumption but are also dependent on fleet mix and engine type. Downward trends in NO<sub>x</sub> emissions reflect the gradual phasing out of older B747-200 freighters. The increase in NO<sub>x</sub> emissions over 2002–2003 was due to the introduction of two B747-200 freighters to the mainline fleet that had been on lease to Air Hong Kong.

At Cathay Pacific, efforts to increase fuel efficiency through maintaining and operating our fleet to the highest standards are essential in minimising our contribution to climate change.

## LOCAL AIR QUALITY

Emissions from flight operations, especially during landing and take-off, can affect local air quality.

In Hong Kong, our home base, air quality is still poor at certain times of the year. The correlation between Hong Kong's air quality and emissions from industrial and transport sources in Hong Kong and the Pearl River Delta is complex. However, it is clear that aircraft contribute only a small part to the total emissions from all sources in Hong Kong. According to the Hong Kong Air Pollution Emission Inventory only 3.6% of NO<sub>x</sub> emissions in Hong Kong in 2000 and 3.1% of non-methane volatile organic compound (VOC) emissions were from aviation related practices.

Over the past decade, concentrations of ozone have been slowly increasing in Hong Kong, indicating a deterioration in regional air quality. Ozone is a major constituent of photochemical smog and is formed by reactions between oxygen, NO<sub>x</sub> and VOCs under sunlight. In areas outside urban centres, such as North Lantau, where HKIA is located, ozone levels tend to peak in the afternoon, when pollutants have accumulated and sunlight is strong<sup>3</sup>. In the winter months, even though the sunlight is less strong, this effect can be particularly noticeable in North Lantau, as humidity and cloud

cover are low and light breezes transport traffic emissions from urbanised areas.

It is in Cathay Pacific's best interests to ensure that Hong Kong remains an attractive city for recreational and business visitors. As such, we have a role to play in improving the air quality of Hong Kong. The most direct way we can do this is by maintaining and operating our fleet to the highest standard.

During 2003, NO<sub>x</sub> emissions from Cathay Pacific's mainline fleet during landing and take-off at HKIA are estimated at 1,040 tonnes. This is equivalent to about 30% of total NO<sub>x</sub> emissions from aircraft in Hong Kong and consistent with the fact that Cathay Pacific accounted for approximately 27% of all aircraft movements at HKIA and operate only larger wide-bodied aircraft. Cathay Pacific NO<sub>x</sub> emissions were calculated using information in the International Civil Aviation Organization (ICAO) Engine Exhaust Emissions Data Bank. The ICAO data assumes full thrust during take-off, which is rarely the case, and the actual emissions are probably much lower than those calculated. In addition, the data is calculated for the full landing and take-off cycle, up to 1000m, at which time aircraft are well away from the airport.

<sup>2</sup> Compiled by the Hong Kong SAR Government Environmental Protection Department.

<sup>3</sup> In urban areas, ozone levels are lowest during the rush hour, as nitric oxide acts as an effective scavenger of ozone.



In response to concerns of increased nitrogen dioxide (NO<sub>2</sub>) levels in future growth scenarios, the Hong Kong Airport Authority intends to commence air quality monitoring at HKIA in May 2004.

A number of different mechanisms are being developed by the aviation industry and airport authorities to address local air quality concerns. For instance, ICAO's Committee on Aviation Environmental Protection (CAEP) is constantly reviewing certification standards to limit aircraft NOx emissions. The existing

CAEP/4 Standard is required to be met by all new commercial aircraft and if a new recommendation recently made at CAEP/6 comes into force, at 12% below CAEP/4, then all new aircraft produced after 2008 will be required to meet this standard. These NOx standards are not being used as an operational restriction, though a small number of airports in Europe have introduced NOx charges. It looks likely that others will follow, including some of the major hubs that are served by Cathay Pacific, such as London Heathrow as of April 2004.

## AIRCRAFT NOISE

Aircraft noise during landing and take-off is a very real issue, particularly for communities living near airports and under flight paths. The extent of noise impacts from aircraft during landing and take-off is determined by factors including the number of aircraft movements, population patterns and the type of aircraft used. Noise nuisance was a key consideration for relocating Hong Kong's airport from Kai Tak in Kowloon to Chek Lap Kok on Lantau Island. When the airport was located at Kai Tak, over 750,000 people lived within the NEF 25 contour<sup>4</sup>. With the relocation to Chek Lap Kok, this has been reduced to less than 200 people<sup>5</sup>.

Aggregate noise levels at airports depend critically on the noise emitted by each aircraft and aircraft noise at source is controlled by internationally agreed standards established by ICAO. The ICAO/Chapter 3 standard is currently required by most airports, whilst the ICAO/Chapter 4 standard will be introduced for all new commercial aircraft after 2006. All Cathay Pacific aircraft are certified to Chapter 3 and the existing passenger fleet also meets the stricter Chapter 4 requirements.

<sup>4</sup> NEF 25 is the contour within which aircraft noise is unacceptable from a planning and land use point of view. In line with international standards adopted by developed countries, the Hong Kong Planning Standards and Guidelines stipulate a more stringent criterion of NEF 25 contour for the new airport at Chek Lap Kok (c.f. NEF 30 for old Kai Tak International Airport).

<sup>5</sup> Information presented on HKSAR Civil Aviation Department Website.

## Cathay Pacific invests heavily in training to achieve operational excellence



In addition to noise certification standards, ICAO has devoted considerable resources to promoting a balanced approach to noise management, which comprises four elements: reduction of noise at source, operational procedures, operational restrictions, and land use planning. Cathay Pacific has developed its own landing and take-off procedures for particularly noise-sensitive airports. In addition, we fully supported the Hong Kong Government's Civil Aviation Department (CAD) in the introduction of continuous descent approach (CDA) as a standard landing procedure at HKIA. This type of approach reduces noise impact as well as minimising fuel burn. Cathay Pacific works proactively with the CAD to help solve potential noise issues at planned residential and other sensitive developments in the vicinity of HKIA.

Internationally, Cathay Pacific always strives to comply with operational restrictions, such as night time constraints, as far as Air Traffic Control conditions and aircraft technology allow. All our fleet,

with the exception of the B747-200 freighters, are fitted with a computerised Flight Management System (FMS). The installation of the FMS on our B747-200 freighter fleet by the second quarter of 2005 will further improve our track keeping on noise preferential routes.

A number of airports to which Cathay Pacific operates have introduced noise restrictions and at London Heathrow a noise infringement system is in place. During 2003, we followed all ICAO recommended procedures at London Heathrow. However, the strict night standard has meant that even with all operational procedures in place, some breaches were unavoidable. Cathay Pacific paid a total of £3,000 in 2003 in noise charges for four separate incidents. This shows a marked improvement on our 2002 performance, when we paid a total of £9,500 for 17 incidents. This reduction of instances is a result of the introduction of a revised night time take-off procedure by Cathay Pacific for use at London Heathrow.

Some other airports, particularly those in Europe, operate a notification system. For instance at Brussels airport, where we operate cargo aircraft, we received 29 and 26 noise related notifications in 2002 and 2003 respectively.

During 2002, Hong Kong's CAD handled a total of 325 noise-related complaints compared to 369 in year 2001. It is understood that the CAD

will approach individual airlines if there are recurring complaints relating to specific aircraft. During the course of 2001, 2002 and 2003, the CAD did not raise the issue of noise complaints with Cathay Pacific.

### MAINTAINING AND OPERATING THE FLEET

We maintain and operate our fleet to the highest possible standards. Keeping this as a priority has been, and will continue to be, a core element of our management approach and philosophy. Not only does this ensure the highest degree of safety and reliability, it also reduces gaseous emissions and aircraft noise. However, decisions about how we maintain, operate and expand our fleet are rarely straightforward. Making progress towards one objective may be detrimental to another. For example, increasing engine combustion temperatures improves fuel efficiency and reduces CO<sub>2</sub> emissions but can increase NO<sub>x</sub> emissions.

For the foreseeable future kerosene is likely to remain the main aviation fuel. As such, the key to reducing costs and environmental impacts of fuel burn lies in improving fuel efficiency.

In 2003, Cathay Pacific's mainline fleet consumed a total of 2.55 million tonnes of aviation fuel making it the second largest operating expense after staff costs. In the context of

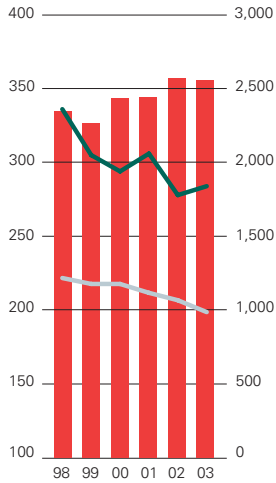


## Latest jet engines offer reduced noise footprint and lower emissions

### Aircraft Fuel Consumption and Efficiency

#### Total Flights

grammes/RTK ● Fuel Consumption '000 tonnes  
grammes/ATK ●

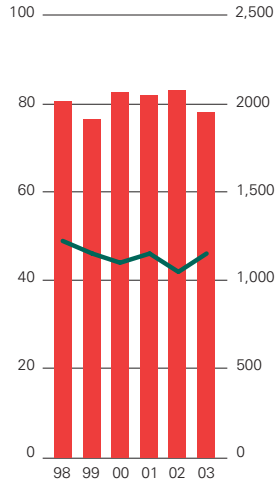


intense competition and upward pressure on costs, we make every attempt to minimise our fuel costs and consumption, while ensuring we deliver world-class services to our customers.

The fuel efficiency of our mainline fleet has increased by 10.3%, 15.5% and 7.5% per ATK, per RTK and per RPK (passenger fleet only) respectively over the six years since 1998. Fuel efficiency is determined by a number of factors including composition and age of the fleet, load factors, delays caused by congestion and indirect routings arising from differences in air traffic systems. A general downward trend

#### Passenger Flights<sup>6</sup>

grammes/RPK ● Fuel Consumption '000 tonnes



is a reflection of improved engine efficiency, among other factors. The apparent reduction in efficiency during 2003 is due to the significant drop in traffic and capacity operated during the SARS period.

At Cathay Pacific, we have developed a wide range of initiatives and measures to improve fuel efficiency. We operate a relatively young passenger fleet with an average age of 7.6 years in 2003, compared to an average worldwide commercial jet fleet age of approximately 12.6 years<sup>7</sup>. Furthermore, we use, as far as commercially practicable, new generation engines. Our seven

B747-200 freighters are maintained to a high standard by incorporating the latest manufacturer recommendations and modifications.

We devote considerable time to rigorous route planning. The aim is to develop optimal flight plans to help minimise fuel consumption, while ensuring compliance with regulatory fuel uplift requirements, company policy on fuel uplift, balancing over-flight charges and the needs of airports and air traffic control. The fuel uptake of each aircraft is closely monitored by our Flight Operations Department to allow further refinement to fuel requirements. Such fine-tuning is an important element of flight operations, especially for long haul flights, where fuel uplift can be a critical factor for payload and fuel efficiency.

In addition, we carefully consider weight issues during the design and purchasing of cabin furnishings and catering equipment and seek practical opportunities to reduce weight. Careful re-engineering has made our business class seats among the lightest in the market. The plastic cutlery in economy class has saved almost 30kg on regional flights and 65kg on intercontinental flights, and is estimated to save approximately 660,000kg of fuel in one year.

<sup>6</sup> This does not take into account the additional cargo uploaded on these flights, nor is account taken of non-revenue passengers.

<sup>7</sup> Source: IATA World Air Transport Statistics.

## Inflight Services

Each day, we use large quantities of resources and produce a wide range of wastes from our inflight services. These wastes present a challenge to Cathay Pacific and to our service providers, in terms of how we conserve resources, minimise waste generation and maximise reuse opportunities.



Our Environmental Policy endorses the principles of 'replace, reduce, reuse, recycle'. We are actively implementing stringent waste management practices and seeking new and improved methods for reducing, reusing and recycling waste throughout all of our facilities. This is being formalised into an overall Waste Management Strategy for implementation starting in 2004. Cathay Pacific is investigating the management and disposal of waste at flight destinations worldwide, with the overall objective of incorporating these issues into the Waste Management Strategy.

All galley food, newspapers and other wastes in the cabins of inbound aircraft to Hong Kong are collected by our catering division, Cathay Pacific Catering Services (CPCS). CPCS ensures that inflight magazines and newspapers in good condition are sorted and packed for subsequent upload to departing flights. All paper wastes, including old newspapers and carton boxes, are stored in a central area within CPCS for subsequent collection by a designated recycler. We currently do not recycle in-flight beverage containers, such as aluminium cans and mineral water bottles, due to the logistical difficulties of sorting and storing inflight. We hope to identify and implement a workable system for this in 2004. We are currently examining the technical feasibility and contractor availability for composting food wastes.

In addition to waste recycling and disposal practices, we have developed a number of initiatives with our service providers to reduce the generation of wastes. We no

longer use menu cards in Economy Class on regional flights. Menu cards in Business and First Class are collected and checked after each flight and, if in good condition loaded onto the next flight. Menu cards that cannot be reused are collected by a designated contractor for recycling. We also regularly review which meals passengers choose and subsequently refine menus to reduce food wastage. We minimise the package quantity of disposable items, for example the pack size of cocktail napkins was reduced from 100 to 25 sheets per pack. This helps to reduce waste, since for hygiene reasons all disposable items, once opened, must be disposed of at the flight's destination. The plastic cutlery used in Economy Class is cleaned and returned to the supplier for reuse into other products.

Managing catering and inflight waste will be a key priority in 2004 and beyond

# Cathay Pacific City

Cathay Pacific City comprises offices, a flight training centre, an airline stores building, a 500 room staff hotel, a staff canteen and other supporting facilities. From the initial concept it was designed with the environment in mind.

The majority of our nearly 4,000 ground staff in Hong Kong are based at Cathay Pacific City and over 1,500 flight crew pass through every day as the building provides pre-flight briefing areas and dedicated immigration facilities allowing crew to proceed directly to aircraft.

The two main environmental concerns for Cathay Pacific City are energy conservation and waste management and these, together with other issues, are systematically managed through our ISO 14001 certified environmental management system.



## ENERGY CONSERVATION

Energy consumption, as a major operating expense and important environmental concern, is a central issue at Cathay Pacific City. A number of energy management features have been incorporated including:

- ▶ *A computerised building management system to centrally control air-conditioning, lighting and lifts.*
- ▶ *Variable air volume control and seawater cooling systems, which have reduced energy consumption by 30%.*
- ▶ *Double-glazed windows and sensor controlled window shades to reduce solar gain and eliminate solar glare.*
- ▶ *Light wells, atriums and floor-to-ceiling windows to maximise the use of natural light.*
- ▶ *Low loss electronic ballast (with a higher energy efficiency than traditional magnetic ballasts) and double parabolic reflectors in high efficiency lighting tubes for general lighting.*
- ▶ *Lighting zones to allow separate switching on and off of lights in areas that are only used occasionally.*

In 2003, we consumed a total of 29.9 million kWh of electricity compared with 32.3 million kWh in 2002. This reduction reflects the determined efforts made during SARS to reduce building operational costs.

## In 2003, 40% of office waste at Cathay Pacific City was collected for recycling



### WASTE MANAGEMENT

At the corporate level, Cathay Pacific is a member of the Airport Community Waste Reduction Task Force, which meets on a regular basis to discuss ideas and initiatives for waste reduction and management within the airport area. This is led by the Corporate Environmental Manager of the Hong Kong Airport Authority. As part of this initiative, all Airport Authority tenants are encouraged to join the Government-led waste reduction initiative, known as Wastewi\$e. The Wastewi\$e scheme requires each member to implement waste management initiatives and establish waste reduction targets, which are agreed and monitored by the Environmental Protection Department of the Hong Kong SAR Government. As a member of the Wastewi\$e scheme, the following waste management initiatives and targets have been established by Cathay Pacific:

▶ *Office best practices, including reuse of paper, encouraging reduced printing, the use of email and Intranet for office communications.*

▶ *Separation and sorting general waste at Cathay Pacific City, allowing paper, aluminium cans and plastics to be collected separately for recycling. This reduces the amount of waste going to landfill and also provides a small income to Cathay Pacific to offset disposal costs.*

▶ *The use of recycled toner cartridges for printers, with used cartridges being collected by the recycling company for refilling. In 2003, 678 new toner cartridges were purchased whilst 1,478 came from a recycled source.*

▶ *Donation of unsold food to a local food donation programme in the local community. Unsold food from the food court at Cathay Pacific City and our hotel is collected on a daily basis by a charitable organisation for distribution to needy communities at the nearby town of Tung Chung.*

In 2003, we recycled a total of 721kg of aluminium cans, 17,070kg of clear plastics and 233 tonnes of waste paper within Cathay Pacific City.

Reducing waste generation is everyone's responsibility at Cathay Pacific. On each floor of our offices, there are specially designed bins allowing staff to separate recyclables such as aluminium cans, clear plastics and waste paper from other general garbage. Many office staff also have a dedicated green bin at their desks for waste paper collection. This is collected and sorted by the facilities management team and subsequently collected by an independent contractor.

## Aircraft Maintenance and Other Outsourced Services

Many of our support services are outsourced to Cathay Pacific subsidiaries and associated Swire group companies. We work together with these entities to develop cost-effective solutions to environmental issues. Outsourced activities include aircraft maintenance, engine maintenance, inflight catering, ramp handling services at Hong Kong International Airport and laundry facilities.

### HONG KONG AIRCRAFT ENGINEERING COMPANY LIMITED (HAECO)

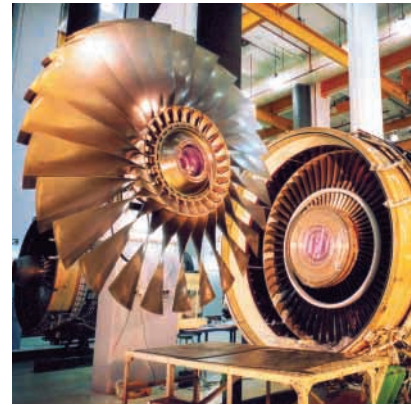
HAECO, in which Cathay Pacific has a 27% stake, is the only full service provider of both line and base maintenance at HKIA and one of the largest aircraft maintenance facilities in Asia. The company provides round-the-clock ramp handling and maintenance services to about 50 airlines/operators processing 80,000 plus flights annually.

HAECO's commitment to environmental protection is part of its Mission Statement and Environmental Policy. The latter outlines initiatives towards effective environmental management, recognising the extent of environmental issues associated with large scale aircraft maintenance works. Since 1996, a Safety and Environmental Steering Committee has been established to develop environmental management plans. The Committee, chaired by the Director of Finance, meets regularly to review and allocate resources for environmental and safety issues.



Since 1996, an Environmental Protection and Industry Safety Section has been established to develop, promote and encourage the implementation of green initiatives throughout HAECO. The Facilities Department of the HAECO site in Tseung Kwan O, Hong Kong received ISO 14001 certification in 2000.

HAECO has, over the years expanded beyond the boundaries of Hong Kong into Mainland China with Taikoo (Xiamen) Aircraft Engineering Co. Ltd. (TAECO) at Xiamen and Taikoo (Shandong) Aircraft Engineering Co. Ltd. at Shandong. Joint ventures with key major original equipment manufacturers have been established in pursuit of providing 'total care' services to its customers.



### HONG KONG AERO ENGINE SERVICES LIMITED (HAESL)

A joint venture between HAECO (45%), Rolls-Royce (45%) and SIA Engineering Co. (10%), HAESL commenced operations in 1997, taking over engine overhaul activities from HAECO. HAESL combines the strengths of Asia's most successful maintenance, repair and overhaul company with Rolls-Royce, one of the world's most respected engineering names.

Through its policy statement, HAESL is committed to be an environmentally responsible company and to contribute to sustainable development. To assist in the understanding and management of environmental issues and in line with Swire group objectives, HAESL has implemented a three-year environmental action plan for the



period 2003 to 2005. In 2003, an Environmental Committee, chaired by the General Manager Operations, was established to consolidate existing initiatives and to oversee future programmes.

#### CATHAY PACIFIC CATERING SERVICES (CPCS)

CPCS, a division of Cathay Pacific, has over 37 years of airline catering experience in Hong Kong and is an integral part of our successful operations. CPCS now operates four flight kitchens in the Asia Pacific region (Hong Kong, Cebu, Ho Chi Minh City, Taipei) and two in Canada (Vancouver, Toronto), with an average production of over 70,000 meals per day in 2003. In Hong Kong, CPCS operates one of the world's largest flight kitchens, producing an average of 35,000 meals per day, and accounting for 72% of the Hong Kong airline catering market in 2003.

CPCS has an environmental management system and has maintained its ISO 14001 certificate since 1996. The certification is valid for all activities related to the provision of inflight catering services including supporting activities such as waste control and disposal, marketing and material control.

Since 2002, an Environmental, Health and Safety (EHS) Steering Committee, reporting directly to the Chief Executive Officer, has been established to review and endorse company policies and strategies on major environmental, health and safety issues.

#### HONG KONG AIRPORT SERVICES LIMITED (HAS)

A joint venture between Cathay Pacific (70%) and Hong Kong Dragon Airlines Limited (30%), HAS is the largest ramp handling company in Hong Kong, serving 24 airlines. Major activities include the operation of aerobridges and passenger steps, loading and unloading of aircraft and the transportation of passengers, baggage, cargo and mail. These activities rely on a fleet of 450 motorised (of which 86 are electric) and 1,800 non-motorised items of ground support equipment and 1,600 staff.

HAS has a comprehensive environmental management plan for the provision of ramp handling services at HKIA. HAS's dedicated environmental team works closely with the Technical Services section on all environmental issues. Environmental matters are discussed in the monthly Business Support Department meetings.

#### VOGUE LAUNDRY SERVICE LIMITED

Our wholly owned subsidiary, Vogue Laundry, operates Asia's largest single-site laundry plant providing a comprehensive range of laundering and dry-cleaning services serving over 20 airlines and 30 hotels with a daily output of 95 metric tonnes.

In 2003, Vogue achieved ISO 14001 and OHSAS 18001 certification in addition to its existing ISO 9001 certification for the provision of laundering and dry-cleaning services, the first commercial laundry to do so in Hong Kong. The Environmental Committee, chaired by the Manager Technical and Quality Assurance meets every two months. At Vogue, there are a number of ongoing environmental initiatives and programmes, focussing on water and energy conservation, air pollution control and waste management. A current focus is in ensuring full utilisation of machinery to maximise energy efficiency.

## Passenger and Staff Well-Being

At Cathay Pacific, we are committed to the well-being of our passengers and staff. The year 2003, with the outbreak of SARS, was particularly challenging.



### SEVERE ACUTE RESPIRATORY SYNDROME (SARS)

In March 2003, the World Health Organisation (WHO) issued a global alert on SARS and imposed travel advisories on affected areas.

Following the outbreak of SARS, we responded quickly to ensure the health of our passengers, crew, frontline staff and all employees through various initiatives including:

- ▶ *Public health alerts at all our check-in counters at Hong Kong International Airport.*
- ▶ *Educating and briefing our front-line staff including airport personnel and aircrew.*
- ▶ *Temperature screening of aircrew prior to flight duty at our headquarters, Cathay Pacific City.*
- ▶ *Distributing surgical facemasks, additional blankets and linens, on an as-needed basis, to passengers, front-line staff and crew.*

- ▶ *Special handling procedures for suspected inflight SARS cases.*
- ▶ *Increased ventilation and intensified office sanitation and hygiene procedures at Cathay Pacific City and HKIA.*
- ▶ *Introducing new WHO approved disinfectant for aircraft cleaning.*
- ▶ *A special paid sick leave programme for all staff who had close contact with confirmed SARS cases and those who had symptoms of respiratory infections.*
- ▶ *A programme offering alternative work options, such as working from home or annual leave, for those staff who were pregnant or suffering from a serious underlying medical condition.*

▶ *A SARS educational videotape for staff.*

▶ *Daily electronic SARS updates to all employees.*

We continue to provide the following preventive measures:

- ▶ *Uploading facemasks and gloves on board each flight.*
- ▶ *Continued health education and updates on SARS as appropriate.*

### CABIN AIR QUALITY

To ensure that cabin air is free from harmful or hazardous concentrations of gases or vapours, High Efficiency Particulate Arrestor (HEPA) filters are installed throughout our passenger fleet. These filters are highly efficient in removing more than 99.7% of particulates and airborne bacteria in the cabins. To provide further assurance that our systems of air quality controls within the airline cabins continue to be effective, we monitor the cabin air quality of random passenger flights. During 2003, we fully met the requirements of the relevant standards<sup>8</sup>.

### DEEP VEIN THROMBOSIS (DVT)

DVT is a condition where blood clots develop in the deep veins of the legs which in rare cases can result in lung collapse and heart failure. Medical research indicates that DVT can be associated with prolonged immobility such as that associated with long distance travel. Whilst there is no conclusive evidence which associates air travel with DVT, we welcomed the commencement in 2001 of a comprehensive research project by the WRIGHT<sup>9</sup> group, under the auspices of WHO and IATA, on the relationship between air travel and the syndrome. We assisted research

<sup>8</sup> United States Codes of Federal Regulations (CFR Title 14 Sections 25.831 and 25.832, applicable to fresh air supply rate, CO<sub>2</sub>, CO and ozone).

<sup>9</sup> The World Health Organisation 'Research into Global Hazards of Travel'.

## Health and Safety Data for Cathay Pacific Staff

	No. of accidents*		Lost time frequency rate (No. of accidents/no. of hours worked x 100,000)	
	2002	2003	2002	2003
Ground Staff	32	17	0.38	0.21
Cabin Crew	300	804	7.80	23.10
Cockpit crew	0	0	0	0

\* Where an accident causes at least one day sick leave.

into DVT through the testing of passenger and staff volunteers in conjunction with Imperial College, London.

We provide passengers with health information on how to minimise the risk of DVT through a variety of means, including the following:

- ▶ *Health alert information on electronic and hardcopy passenger tickets.*
- ▶ *Educational information in our inflight magazine, Discovery.*
- ▶ *Demonstrative exercises through inflight video that can help increase circulation.*
- ▶ *Individuals who are at high risk are advised to consult their personal physician for fitness to fly and consideration of preventive medication. Our aviation medical office offers advice on the effects of air travel and likely implications on varying medical conditions.*
- ▶ *On board first-aid and physician medical kits and automatic external defibrillators meeting or exceeding both JAA and FAA standards, on all our passenger aircraft.*
- ▶ *The services of a US based 24-hour aeromedical service company for professional management of all inflight medical incidents.*

### COSMIC RADIATION

At aircraft altitudes where there is reduced atmospheric shielding, radiation levels due to cosmic sources are greater than at ground level. Cosmic radiation levels are also higher near the polar region than around the equator. This is one of the factors to be considered when managing polar flight routes such as the Hong Kong to New York non-stop flights to be launched by Cathay Pacific in July 2004.

In recognising potential health concerns for air crew, the EURATOM Directive was introduced in May 2000 which specified education, monitoring, adjustment of work schedules and record keeping requirements for EU member states. Cathay Pacific proactively implemented a radiation exposure monitoring system for all aircrew in April 2002 in response to the Directive. This became a Hong Kong CAD requirement in September 2002.

The Company continues to conduct ongoing education, communication and adjustment of work schedules of those individuals approaching the recommended limit. We are introducing an additional safety factor through the use of an internal action limit, which is lower than that recommended by the CAD.

If staff are found to have levels approaching the internal action limit, their roster schedule is reviewed individually and adjusted accordingly to ensure their exposure level remains well within CAD guidelines. We will continue to closely monitor scientific updates and developments in this area and are committed to taking all necessary measures to ensure the health and safety of our crew, other employees and passengers.

### WORKPLACE HEALTH AND SAFETY

The success of our business relies on our people. We recognise that it is important to maintain a safe and secure workplace for our staff to perform their duties without undue discomfort or fatigue. We have implemented a comprehensive range of health and safety management systems. The objectives of these are to identify risks, design and promote safe working practices, provide staff with safety training and identify nominated safety personnel.

For cabin crew there was an increase in reported injury leave in 2003 compared to 2002. This reflects in part a greater emphasis on direct reporting by staff, with staff being encouraged to report even minor injuries and for leave in this respect to be captured as injury-related sick leave. Reported air crew injuries are discussed monthly by the Airline Safety Review Committee.

## Cathay Pacific City Indoor Air Quality Monitoring Results (2003)

IAQ Parameters	Units	Hong Kong IAQ Objectives		Range of Monitoring Results in 23 Locations
		Excellent	Good	
Carbon Dioxide	ppmv	< 800	< 1000	522 – 1212
Respirable Suspended Particulates	ug/m <sup>3</sup>	< 20	< 180	41 – 96
Formaldehyde	ug/m <sup>3</sup>	< 30	< 100	10.5 – 38.6
Total Volatile Organic Compound	ug/m <sup>3</sup>	< 200	< 600	145 – 547
Radon	Bq/m <sup>3</sup>	< 150	< 200	22 – 134
Room Temperature	°C	20 to < 25.5	< 25.5	21.5 – 24.5
Relative Humidity	%	40 to < 70	< 70	51.8 – 66.5
Air Movement	m/s	< 0.2	< 0.3	0.01 – 0.10
Carbon Monoxide	ug/m <sup>3</sup>	< 2000	< 10000	Below detection limit – 1145
Nitrogen Dioxide	ug/m <sup>3</sup>	< 40	< 150	5.6 – 32.0
Ozone	ug/m <sup>3</sup>	< 50	< 120	Below detection limit
Airborne Bacteria	CFU/m <sup>3</sup>	< 500	< 1000	134 – 551

**Display Screen Equipment**

In keeping with industry best practices and recent legislation, we have provided employee education on the health effects of working with computer display screens and terminals, workstation ergonomic consideration, and early intervention strategies. At Cathay Pacific City, there are designated Departmental Safety Officers who have undergone training and conducted risk assessments of all workstations in our headquarters. Modifications have been made on those that were identified as needing adjustment.

**Indoor Air Quality at Cathay Pacific City**

At Cathay Pacific City, we implemented an indoor air quality (IAQ) monitoring programme in advance of the introduction of a voluntary IAQ certification scheme by the Hong Kong SAR Government Environmental Protection Department. The scheme monitors 12 parameters and has thresholds for two objectives: Excellent and Good. For 2003, we achieved 'Good' for all parameters, except CO<sub>2</sub>. The latter was slightly elevated in two areas and measures for improvement are being identified. We aim to meet the 'Good' objective for CO<sub>2</sub> in 2004 in all areas.



# Data Summary

## Fuel Consumption / Efficiency and Air Emissions

Aircraft operations	Units	2003	2002	2001	2000	1999	1998
<b>Operating Statistics*</b>							
ATK	million	12,789	12,394	11,452	11,121	10,379	10,544
RTK	million	8,982	9,219	7,947	8,275	7,431	6,974
RPK	million	42,688	48,924	44,466	47,042	41,247	40,594
<b>Total Flights</b>							
Fuel Consumption	thousand tonnes	2,550	2,560	2,431	2,429	2,263	2,343
Fuel Efficiency	grammes/ATK	199	207	212	218	218	222
improvement since 1998	%	10.3	7.0	4.5	1.7	1.9	0.0
Fuel Efficiency	grammes/RTK	284	278	306	294	305	336
improvement since 1998	%	15.5	17.3	8.9	12.6	9.4	0.0
<b>Passenger Flights Only</b>							
Fuel Consumption	thousand tonnes	1,953	2,074	2,050	2,068	1,912	2,007
Fuel Efficiency	grammes/RPK	46	42	46	44	46	49
improvement since 1998	%	7.5	14.3	6.8	11.1	6.2	0.0
Global CO <sub>2</sub> emissions <sup>†</sup>	tonnes	8,203,776	8,034,096	7,106,766	7,246,122	7,527,204	7,292,094
Global CO emissions <sup>†</sup>	tonnes	7,701	6,811	6,674	7,308	9,065	11,455
Global NO <sub>x</sub> emissions <sup>†</sup>	tonnes	33,107	31,867	28,814	31,988	34,234	32,845
Global HC emissions <sup>†</sup>	tonnes	1,666	1,302	1,548	2,131	3,234	4,902
NO <sub>x</sub> emissions during landing and take-off cycle at HKIA	tonnes	1,040	–	–	–	–	–

\* Cathay Pacific mainline fleet only.

† CO<sub>2</sub>, NO<sub>x</sub>, CO and HC emissions from Cathay Pacific aircraft (1998–2003) were calculated by the aircraft manufacturers, based on data provided by Cathay Pacific on fuel uptake, engine type and flight routes. Emissions were calculated for January and July for each year and then multiplied to derive annual figures.

## Cathay Pacific City

Issue	Units	2003	2002	2001	2000	1999	1998
Electricity consumption	kWh	29,884,704	32,324,647	31,317,795	33,044,825	29,107,318	–
Seawater consumption	m <sup>3</sup>	6,846,000	7,698,000	7,081,000	8,903,000	8,756,000	–
Potable water consumption	m <sup>3</sup>	11,482	11,460	14,571	17,942	12,277	2,956
Towngas consumption	m <sup>3</sup>	12,416	19,156	32,518	42,561	41,570	8,906
Paper recycled	tonnes	233	279	276	171	187	154
Aluminum cans recycled	kg	721	701	488	479	202	–
Plastic recycled	kg	17,070	8,400	–	–	–	–
Printer cartridges recycled	pcs	1,888	1,295	855	1363	1103	905
Office waste disposed of	kg	380,570	388,450	–	–	–	–
Food waste disposed of	kg	171,619	171,130	–	–	–	–

– data not available

# Glossary

**ATK** Available Tonne Kilometers  
Overall capacity, measured in tonnes available for the carriage of passengers, excess baggage, cargo and mail on each sector multiplied by the sector distance.

**CAD** Civil Aviation Department

**CO** Carbon Monoxide

**CO<sub>2</sub>** Carbon Dioxide

**CDA** Continuous Descent Approach

**DVT** Deep Vein Thrombosis

**EMS** Environmental Management System

**FMS** Flight Management System

**FAA** Federal Aviation Administration

**HKIA** Hong Kong International Airport

**HC** Hydrocarbons

**IATA** International Air Transport Association

**ICAO** International Civil Aviation Organization

**IPCC** Intergovernmental Panel on Climate Change. A scientific panel appointed by the United Nations Environmental Programme, UNEP, and the World Meteorological Association, WMO, to assess what is happening to the global climate and the impact of climatic disturbances.

**ISO 14001** Environmental Management Systems – Specification with guidance for use.

**JAA** Joint Aviation Authorities  
An associated European body representing the civil aviation regulatory authorities of a number of European states who have agreed to co-operate in developing and implementing common safety regulatory standards and procedures.

**Kyoto Protocol** The Kyoto Protocol was agreed in 1997 to reduce CO<sub>2</sub> and other greenhouse gas emissions.

**NEF** Noise Exposure Forecast  
A method of estimating perceived noise annoyance from airports based on acoustical and operational data. In Hong Kong the NEF 25 contour is the limit within which aircraft noise is considered unacceptable from a planning and land use point of view.

**NO<sub>x</sub>** Nitrogen Oxides

**RPK** Revenue Passenger Kilometers  
Number of passengers carried on each sector multiplied by the sector distance.

**RTK** Revenue Tonne Kilometers  
Traffic volume, measured in load tonnes from the carriage of passengers, excess baggage, cargo and mail on each sector multiplied by the sector distance.

**VOCs** Volatile Organic Compounds

**WHO** World Health Organisation

For further explanation on financial terms, reference can be made to the Cathay Pacific Annual Report 2003.

For suggestions and comments on this report please contact  
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