

Mitigating the impacts of climate change remains one of our greatest environmental challenges as a business. We are dedicated to delivering on our commitment to carbon-neutral growth by continuously improving the sustainability of our flight operations, and continuing to support the UN's landmark 2013 agreement for a global market-based measure (MBM) to address aviation's impact on climate change.

## Content

1	Our Climate Change Position	7	Carbon Offsetting – <b>FLY greener</b>
2	Climate Change Science – Aviation	8	Understanding Climate Change Risks
3	2013 CO <sub>2</sub> Emissions Performance	9	HKIA Third Runway Proposal
4	Fuel Efficiency – A 30 Year Story	10	Our Approach on the Ground
5	The Future – New Fleet & Sustainable Biofuels	11	Business and Community Engagement
6	The EU Emissions Trading Scheme and the IATA Climate Change Task Force		

# 1 Our Climate Change Position

In 2006, Cathay Pacific initiated the identification of specific climate change concerns and participated in the Swire Group's "Value at Stake" project which analysed mechanisms for greenhouse gas reporting and considered the climate change implications for our business. The potential impacts were assessed against our revenues and reputation.

Following this exercise, we developed a clear climate change position as a basis for ensuring progress could continue to be made. With the developments in 2013, some parts of the position statement below have been progressed, such as the setting of Cathay Pacific's own CO<sub>2</sub> target for 2020, International Air Transport Association (IATA)'s commitment to carbon neutral growth by 2020 (CNG 2020), and the securing of a global agreement with International Civil Aviation Organization (ICAO). However, our overall approach remains the same:

## The Cathay Pacific Group Climate Change Position

Substantial reductions in global carbon emissions are urgently required to mitigate the impacts of climate change. Cathay Pacific acknowledges that:

- Aviation is estimated to contribute to approximately 2% of man-made carbon dioxide emissions.
- Improved efficiency can be achieved through technological improvements, operations controls and improved air traffic management systems.
- Absolute emissions will continue to rise as the industry grows.

We are already making a very positive contribution towards addressing climate change by:

- Measuring and reporting openly on our emissions.
- Working with industry partners and regulators to support route improvements and address inefficiencies in air traffic management.
- Maximising efficiency through operational efficiency drives and fleet development.
- Addressing climate change through the development of a carbon management plan and a carbon offset project.
- Calling on governments to put climate change at the heart of a global scheme on emissions.

We support the following:

- The important role that market-based measures can play to help secure the required reduction in global carbon emissions at minimum cost.
- The funding of carbon emission reduction strategies on the ground from any revenues raised through market-based measures.
- The leadership by the International Civil Aviation Organization (ICAO) in establishing a global offset scheme for international aviation.

Cathay Pacific will continue to work through the International Air Transport Association (IATA) and other industry partnerships to facilitate such action.

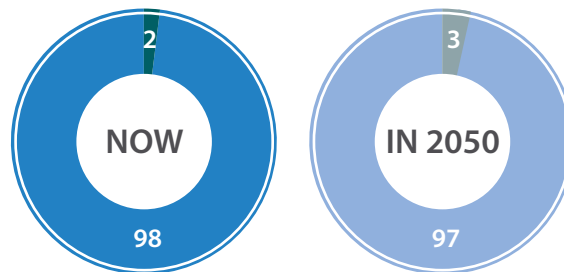
Our Climate Change Position has enabled us to clarify our approach towards addressing climate change through three key principles:

1. Maximising fuel efficiency and reducing fuel wastage through fleet modernisation, technical improvements to our existing fleet, weight management and the implementation of operational efficiency drives.
2. Addressing inefficiencies on air traffic management through collaboration and by supporting industry lobbying efforts.
3. Acknowledging the role of market-based measures such as offsetting and emissions trading.

## 2 Climate Change Science – Aviation

According to the [Intergovernmental Panel on Climate Change \(IPCC\)](#) and the [International Energy Agency \(IEA\)](#), in 2009, aviation accounts for 649 million tonnes of the global total of around 30 billion tonnes of CO<sub>2</sub>, equivalent to 2% of global emissions from human activity. As aviation grows to meet increasing demand, the IPCC has forecasted that by 2050, this could rise to 3%. While the forecast emissions for 2050 can vary significantly, it does highlight the challenge that the aviation industry faces in the next 40 years.

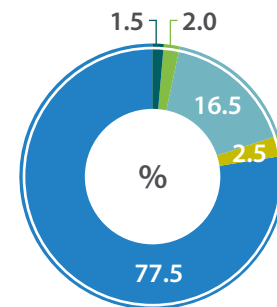
Global Man-Made GHG Emissions (%)



■ Global emissions  
■ Aviation emissions

Source: IPCC, 2007 and IPCC – AIE2005

Comparison of Aviation CO<sub>2</sub> Emissions vs Other Forms of Transport (%)



■ International aviation  
■ International marine  
■ Road transport  
■ Other transport  
■ Emissions from other sectors

Source of CO<sub>2</sub> data: IEA2010

According to the [IPCC](#), aircraft contribute to climate change through the emission of oxides of nitrogen (NO<sub>x</sub>), soot, sulphate aerosols and water vapour. These impacts are summarised below:

Non-CO<sub>2</sub> Emissions from Aircraft

Non-CO <sub>2</sub> Emissions	Nature of Impact
NO <sub>x</sub>	Increases the GHG ozone: warming effect Destruction of methane: cooling effect
Water Vapour	Forms condensation trails: in exhaust air. Warming effects dependent on altitude, location and atmospheric conditions
Sulphate Aerosols	Reflect incoming solar radiation: cooling effects
Soot	Small warming effect

Source: IPCC

Uncertainty remains within the scientific community regarding the full impact of other greenhouse gases (GHGs) in the upper atmosphere. In 2007, the IPCC estimated these effects to be two to four times greater than those of aviation's CO<sub>2</sub> emissions alone, and by 2050, aviation's total climate change contribution, including CO<sub>2</sub> and other effects, could rise to 5% (with a worst-case scenario of 15% of human emissions). However, the IPCC acknowledges that there is still uncertainty and the non-CO<sub>2</sub> impacts of aviation are the subject of intensive academic research.

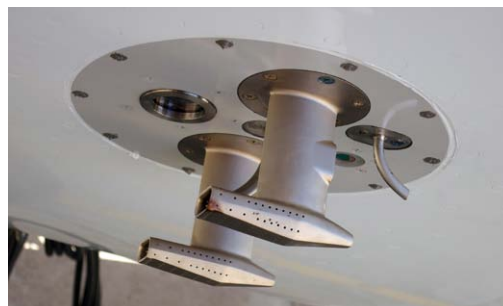
In light of uncertainty about the cumulative or 'multiplier' impacts of other aviation-related GHGs, we continue to focus our efforts on reducing our CO<sub>2</sub> emissions while monitoring the latest atmospheric science research findings of the relevant organisations and research institutes. These include the Goddard Institute of Space Studies (GISS) at the National Aeronautics and Space Administration (NASA), the Institute of Atmospheric Physics at the German Aerospace Centre (DLR), and various academic institutions around the world.



### Contributing to Climate Change Science

To assist in increasing understanding of climate change science in the atmosphere, in 2011 we signed a memorandum of agreement with In-service Aircraft for a Global Observing System (IAGOS) Project, which is part of the European Commission's European Strategy Forum on Research Infrastructures. Its aim is to conduct long-term monitoring of climate change contributors such as aerosol, cloud particles and atmospheric composition through the use of installed equipment on long-haul aircraft of international airlines, where satellite collections are not feasible. While carbon dioxide's effect on climate change is widely known, IAGOS explores the uncertainties about other atmospheric gases when mixed at altitude, including methane, nitrogen oxide and water vapour. By trying to build a global picture of their effects, this will contribute to the scientific understanding of aviation and climate change.

In 2013, one of our Airbus A330-300 aircraft was the first of its type to be equipped with IAGOS scientific instruments following the certification of the IAGOS system on the Airbus A330. It has been deployed primarily on Australian and Middle East routes from Hong Kong to complement other similarly equipped commercial aircraft operating on other routes around the world, which would help build a better global picture of climate change. Data is transmitted from the aircraft on a daily basis to the IAGOS central database for access by science and policy users, including the provision of useful real time data for weather prediction, air quality forecasting and climate models. More information can be found on their website at [www.iagos.org](http://www.iagos.org).

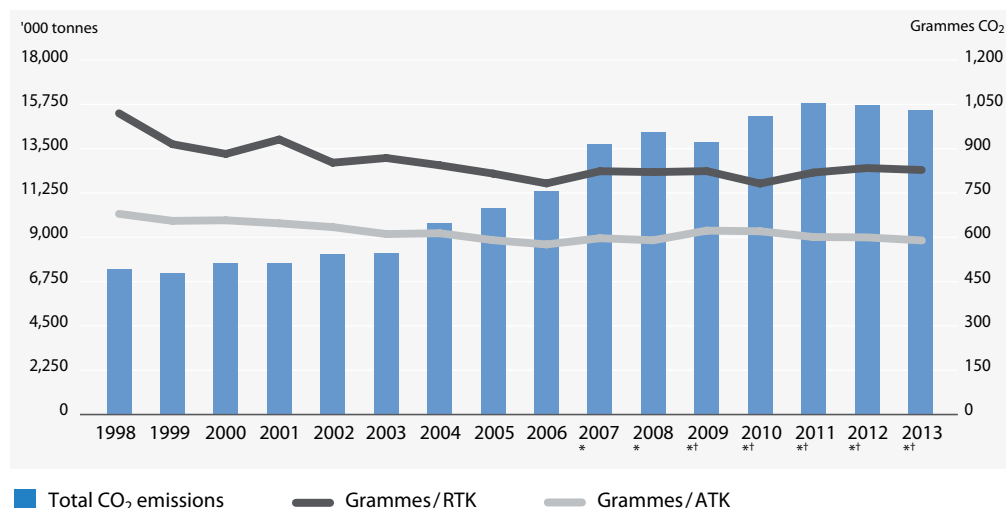


**15.5**  
million tonnes  
CO<sub>2</sub> emissions from  
fuel burn

### 3 2013 CO<sub>2</sub> Emissions Performance

In 2013, CO<sub>2</sub> emissions from fuel burn from the Cathay Pacific and Dragonair fleet remained at 15.5 million tonnes<sup>^</sup>. This represents an absolute emissions reduction of 1.7%, or 0.27 million tCO<sub>2</sub>, from 2012. A reduction in CO<sub>2</sub> emissions was also recorded in relation to capacity (grammes/ATK – available tonne kilometre) and traffic volume carried (grammes/RTK – revenue tonne kilometre). This improvement in our fuel efficiency is in line with our expectation as we continued to upgrade and modernise our fleet while retiring less fuel-efficient aircraft. Since 1998, our CO<sub>2</sub> efficiency in relation to ATK and RTK has improved by 13.3% and 19.1% respectively.

#### Global CO<sub>2</sub> Emissions – Cathay Pacific Group Fleet



\* includes Dragonair

† includes testing, training, and wet lease flights

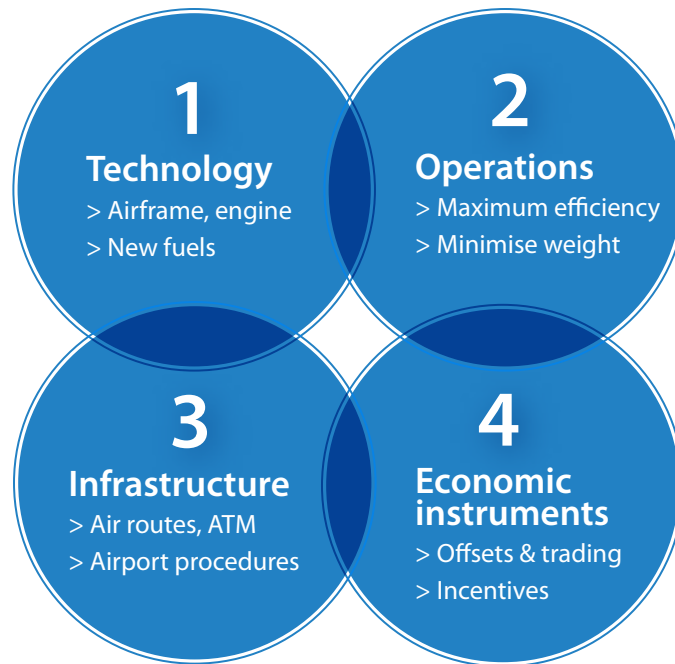
#### 2013 GHG Emissions (tCO<sub>2</sub>e) – Cathay Pacific Group

SCOPE 1	SCOPE 2
<sup>^</sup> <b>15,913,517</b> (99.66%) Aviation Fuel, Fuel Combustion and Towngas	<sup>^</sup> <b>54,842</b> (0.34%) Electricity and Towngas

## 4 Fuel Efficiency – A 30 Year Story

Our operating culture of fuel efficiency has been embedded since our first non-stop long haul flights from Hong Kong to London in 1980 and Hong Kong to Vancouver in 1983. Reducing weight onboard these two routes enabled us to offer a unique and competitive service to our customers. Various teams within Cathay Pacific and Dragonair worked on implementing innovative initiatives such as a fuel monitoring system; use of core washing; introduction of lighter weight onboard equipment (for example food carts and cargo container boxes); and utilising flight techniques and flight planning systems that reduce fuel use – which have been part of the airline's standard operating procedures for the past 30 years. We believe this has allowed us to operate our aircraft in a highly efficient manner, and to a certain extent, play a part in helping to build resilience in the face of adverse conditions such as additional carbon charges and rising fuel prices.

Our fuel efficiency initiatives in these 30 years reflect the IATA four-pillar strategy:



### Commitments

We fully support IATA's climate change commitments:

- |             |  |
|-------------|--|
| <b>2010</b> | An average improvement of fuel efficiency of 1.5% per year                     |
| <b>2020</b> | A cap on aviation CO <sub>2</sub> emissions from 2020 (carbon neutral growth)  |
| <b>2050</b> | Aspiration for 50% reduction in net CO <sub>2</sub> emissions over 2005 levels |

In 2013, apart from the operational efficiencies embedded in our operations, other progress on fuel efficiency included:

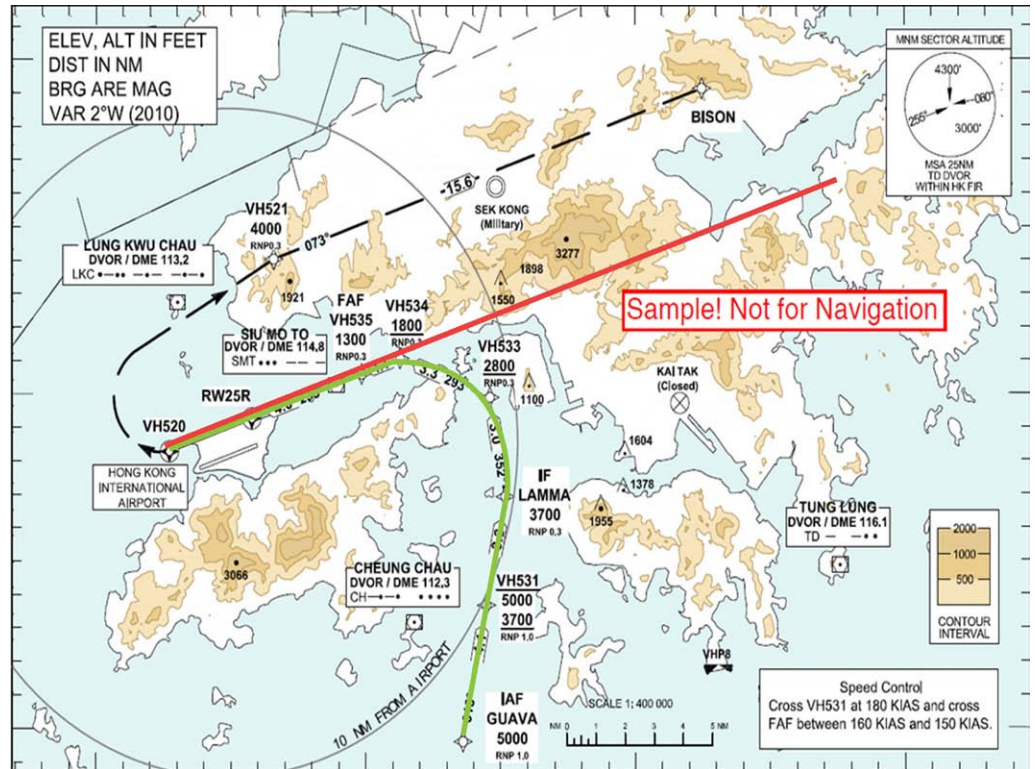
- **Fleet modernisation** – We took delivery of five Airbus A330-300s; nine Boeing 777-300ERs, and five Boeing 747-8F aircraft. We now have a total of 38 Boeing 777-300ERs, powered by two highly efficient GE90 engines, which form the backbone of our ultra long-haul fleet, where the greatest fuel efficiency improvements of 26-28% are realised. Five Boeing 747-400s were retired from our fleet. In addition, we announced an order of 21 Boeing 777-9X to be delivered from 2021, which will deliver greater efficiency, significant fuel savings and lower noise footprint.

#### Boeing 777-300ER Fuel Efficiency Features





- Route improvements** – The development of a new approach through the West Lamma Channel into Hong Kong has resulted in a reduction in distance, fuel usage, carbon emissions and noise. Each flight using the new approach will save approximately 320 kg of fuel, 1 tonne of CO<sub>2</sub>, 24 track miles, and 6.5 minutes flight time. Aircraft equipped with advanced navigational equipment such as the Boeing 777 and Boeing 747-8 aircraft will be able to take advantage of the new flight path.



Aircraft approaching Hong Kong used to fly over Shatin and Park Island (indicated in red).  
The new route takes aircraft through the West Lamma Channel (indicated in green).

In addition, we conducted four demonstration flights from Hong Kong to Sydney, Melbourne, Anchorage, and San Francisco respectively in November. These were the first multi-destination green flights in one day under the [Asia and Pacific Initiative to Reduce Emissions \(ASPIRE\)](#), which is a sister initiative of [INSPIRE](#) which we participated in 2012. By incorporating best practice in air traffic management by optimising airport procedures, air routes, and air traffic management, we highlighted the potential for real reduction in fuel usage and CO<sub>2</sub> emissions on a daily basis. For our flights to Australia, this best practice approach saves 4.5 to 12 minutes per flight. As we operate 13 flights a day into Australia, this could lead to potential savings up to 1,000 tonnes of fuel and 3,150 tonnes of CO<sub>2</sub> per year.



In the past 10 years, Cathay Pacific and Dragonair have implemented the following route improvements:

Examples of Cathay Pacific & Dragonair Route Improvements in the Past 10 Years	Emission Savings
Flexible entry/exit points implementation in China for European flights (Y-1 route)	14,000 tCO <sub>2</sub> /year
North Pacific route improvements	835 tCO <sub>2</sub> /year
Flexible entry/exit points implementation in China for European flights (MORIT route)	0.6 to 0.9 tCO <sub>2</sub> per flight
Re-design of flight paths over the Pearl River Delta	54,000 tCO <sub>2</sub> /year
Further North Pacific route improvements (SFO-HKG)	792 tCO <sub>2</sub> /year
Development of a new approach for flights arriving into Hong Kong on appropriately equipped aircraft, where possible	1 tCO <sub>2</sub> per flight

- Fuel efficiency initiatives** – In 2012, as part of the larger e-Enabled aircraft programme, we signed an agreement with Navtech to develop e-charts, part of a broader plan to develop a fully paperless cockpit. eEnabled Aircraft is a major multi-year initiative to create real time integration of aircraft operational and passenger data with ground infrastructure. One of its benefits is a significant reduction in the amount of paper (up to 15 hardcover manuals on long-haul flights) throughout the whole operation of the CX Group, leading to a reduction in weight on board, fuel used and CO<sub>2</sub> emissions.

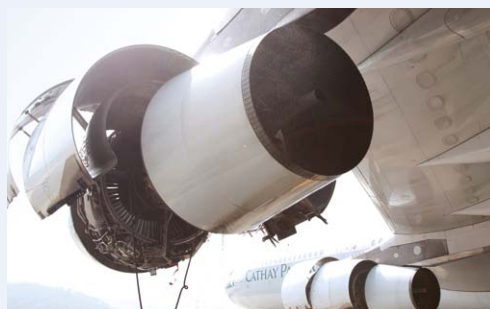
In 2013, we installed the first electronic flight bag (EFB) on a Boeing 777-300ER as part of our eEnabling Project to develop a fully paperless cockpit. Before any paper documents are removed, the EFB will undergo a rigorous six-month validation programme before receiving certification from Federal Aviation Administration (FAA) and Hong Kong Civil Aviation Department (CAD) for operational usage. We will report on progress next year.

A total of 714 core washes were performed in 2013, with a total fuel saving of 4,900 tonnes.

In the past 10 years, we have implemented the following fuel efficiency improvements:

Examples of Cathay Pacific & Dragonair Initiatives on Fuel Efficiency in the Past 10 Years	Emission Savings
KA use of idle reverse thrust when operationally feasible	Data not yet available
KA single-engine taxi after landing	Data not yet available
Weight reduction from inflight magazine paper grammage reduction	880 tCO <sub>2</sub> /year
Modification of engines on our A330 fleet	11,000 tCO <sub>2</sub> /year
Utilising and manually fine-tuning the flexitrack approach – use of real-time wind data to generate flexible flight tracks for flight planning	607 tCO <sub>2</sub> on monitored flights in 2010
Using alternative base coat exterior paint	Depends on aircraft type e.g. 134 tCO <sub>2</sub> on the A340 in 2008
Core washing engines	71,000 tCO <sub>2</sub> since 2010
Weight reductions from catering and food equipment (e.g. lightweight cargo and baggage containers and food carts, cutlery, etc)	78,460 tCO <sub>2</sub> /year since 2004

## Washing an Engine Core



Engine core washing reduces fuel burn and leads to better efficiency. The cores are washed at intervals ranging from two months to half a year, and each wash consumes roughly 120 litres of water – what a person would use for a shower.

### How it is done:

1. A specially-designed hollow J-hook is used.
2. An engineer places the J-hook behind the engine's fan blades.
3. The J-hook is attached to a water hose. Once in place, water will pass through the hook to spray directly onto the compressor blades inside the engine core.
4. Tap water is de-ionised for purification. The water is then heated to 70 to 80 °C and kept in two water tanks where it is pressurised. The high heat de-stabilises molecules, making it easier for engineers and mechanics to remove dirt.
5. The engine is dry-motored, which means it is moved mechanically without using fuel, to create a suction effect. This ensures that water will be sucked in to cover the surface of each rotor blade.
6. The engine core is hosed for five minutes. Technicians then allow the components to soak in the water for five minutes, so that the grease and dust inside the core can dissolve. Mechanics then hose the engine core for another five minutes to flush out the dirty water.

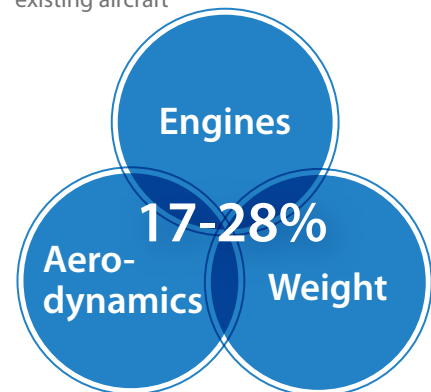
## 5 The Future – New Fleet & Sustainable Biofuels

Our ongoing fleet modernisation programme – purchasing the most fuel efficient aircraft that are appropriate for our operations – is one of the most significant ways that an airline can reduce its environmental impact.

For our passenger aircraft fleet, we will have taken delivery of 53 Boeing 777-300ERs by 2015, 22 Airbus A350-900s, 26 Airbus A350-1000s by 2020, and 21 Boeing 777-9Xs by 2024. On the freighter side, we are expecting delivery of one Boeing 747-8F in 2016 for a total of 14 in the fleet. From 2014 to 2024, we will be taking delivery of 93 aircraft, at an aggregate list price of approximately HK\$222 billion which, according to Airbus Industrie and the Boeing Company, will provide a combined range of fuel efficiency improvements of 17-28% compared to the aircraft these will replace.

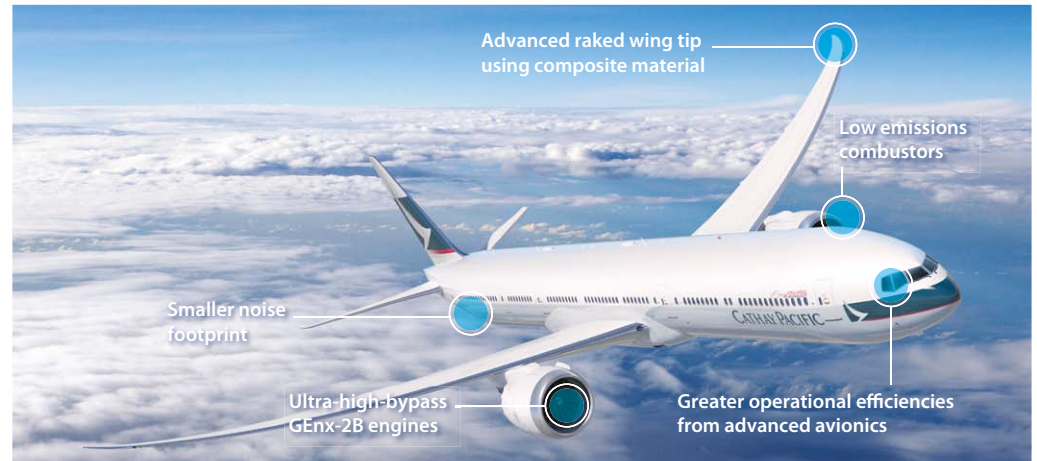
### Enhanced Fuel/CO<sub>2</sub> Efficiency

New aircraft will improve fuel efficiency and CO<sub>2</sub> emissions by at least 17% over existing aircraft

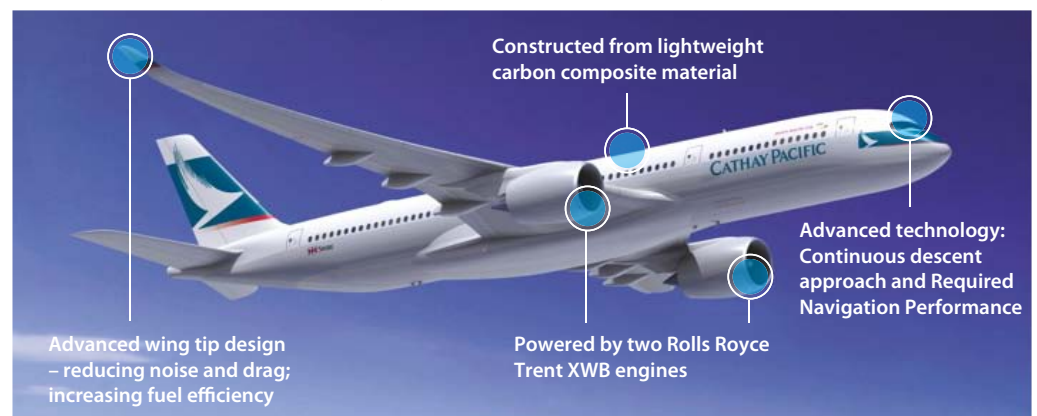


Source: Airbus Industries, Boeing Company, Cathay Pacific

### Boeing 777-9X Fuel Efficiency Features



### Airbus A350-900 Fuel Efficiency Features



The reality is our industry is highly reliant on technological advancements to get us to where we need to be by 2050. While we expect to take delivery of what are still considered conventional aircraft designs, we are increasingly seeing significant changes in aircraft technology through increasingly efficient engines, improved aerodynamics, weight reduction through use of composite materials, eco-design and end-of-life aircraft initiatives, onboard systems to minimise fuel burn and the use of sustainable aviation biofuels.

We recognise the amount of research and development effort that goes into designing, testing and manufacturing a new aircraft and the significant investment and risk associated with bringing a new product to market. But this is the challenge of climate change – where a step-change through radical designs and technology is imperative in meeting our climate change targets. We will work with the manufacturers and developers so that these technologies can be brought to the forefront.

One such example of working together is on the issue of sustainable aviation biofuels. As a member of an industry coalition, the [Sustainable Aviation Fuel Users Group \(SAFUG\)](#), we are united in our desire to accelerate the commercialisation of sustainable jet fuel, including subscribing to a set of sustainability criteria to ensure that these biofuels do not compete with food and drinking water supplies, biodiversity and local populations.

We are a member of the [Roundtable on Sustainable Biomaterials \(RSB\)](#), an international initiative hosted within the Swiss Federal Institute of Technology in Lausanne (EPFL), Switzerland, along with more than 120 organisations around the world. In addition to being a certification body for sustainable biofuels, the RSB actively involves its members in the development and implementation of the RSB Global Sustainability Standard, a global standard for sustainable production, conversion and use of biomass.

From a research perspective, we are one of the very few Airlines selected to join the FAA Centre of Excellence for Alternative Jet Fuels, which is a forum dedicated to the research, development and commercialisation of sustainable aviation biofuels.

Since the appointment of a dedicated Cathay Pacific Biofuel Manager in 2011, we now have a robust sustainable aviation fuels strategy in place and are progressing several projects. One of these projects involves working with an international technology partner to undertake a study on the feasibility of a Hong Kong based biojet fuel facility, producing fuel made from commercial and household waste streams in the city. This local supply chain could help reduce burden on landfill and the use of the fuels would significantly reduce the net CO<sub>2</sub> emissions from our aircraft. Outside of Hong Kong, we continue to pursue opportunities that will lay the foundation for a consistent, sustainable alternative biofuel source for the future.

Despite advancements made on technology, we are reliant on the work of governments and regulators to ensure that we are allowed to fly the most efficient routes and operate in the most efficient manner during take-off and landing. [For example](#), Air Navigation Service Providers (ANSPs) must work with regulators in areas such as the European Union (EU), the United States and China to increase efficiencies in the global air traffic management system, which could reduce the industry's CO<sub>2</sub> emissions by at least 12% of its emissions, roughly around 78 million tonnes of CO<sub>2</sub>.

## 6 The EU Emissions Trading Scheme and the IATA Climate Change Task Force

While Cathay Pacific supports market-based measures as one of the interim solutions to reduce aviation's emissions, we do not support the imposition of the European Union's Emissions Trading Scheme (EU ETS) to airlines based outside of Europe for several reasons. These include:

- Distortion of the market;
- Additional bureaucracy and cost; and
- Most significantly, no guarantee that revenue generated from the scheme will be directed into funding much needed climate change initiatives.

Since 2008, Cathay Pacific has been calling for aviation emissions to be regulated under a global sectoral scheme under the UN's ICAO (International Civil Aviation Organization), which we believe is more appropriate for the global nature of the industry, rather than through regional schemes such as the EU ETS.

Together with other leading international airlines, aviation sector companies and an international environmental NGO, we convened the Aviation Global Deal Group in 2008, setting out plans for a global solution to emissions that meet environmental and developmental needs whilst ensuring a level playing field in our industry, in full support of ICAO and IATA.

Our Head of Environmental Affairs was appointed to IATA's Climate Change Task Force (CCTF) in 2011. The CCTF led the industry's work to develop airlines' commitment to carbon neutral growth for 2020 (CNG 2020), and to develop proposals for a global agreement on emissions under ICAO's leadership. Cathay Pacific's view is that any approach must be clear, transparent and equitable.

In 2012, the CCTF completed extensive work to examine the opportunities and practical issues around the implementation of CNG 2020 and the need for an appropriate mechanism through which this industry commitment could be operationalised. We welcomed the [EU's decision](#) to "stop the clock" on the inclusion of international aviation under the EU ETS for one year, which was conditional on significant progress being made within the United Nation's ICAO process.

The 38<sup>th</sup> ICAO Assembly convened in Montreal in October 2013 where representatives from 191 countries gathered to discuss a range of issues pertinent to the global aviation industry, including climate change. The Assembly agreed to proceed with the development of a global market-based measure (MBM) addressing emissions from international aviation for the next Assembly to approve in 2016 and for implementation by 2020. The Assembly called upon Member States to engage in constructive consultations when designing new and implementing existing MBMs for international aviation. In hindsight, our participation in the Aviation Global Deal and the CCTF played a significant role in the process as it helped to highlight the need to tackle the issue, and garner support between airlines and within IATA for the first comprehensive agreement on climate change for any global sector.

In the same month, the [EU Commission announced its proposal](#) to amend the EU ETS so that aviation emissions would be covered for the part of flights that takes place in European airspace. This proposal was backed by the Environment, Health, and Food Safety Committee of the European Parliament. However, the Council of the European Union, representing the majority of EU Member States, supported the continuation of “stop-the-clock”, which limited the scope to include only intra-European Economic Area (EEA) flights. The latter proposal was approved by the European Parliament and formally adopted by the European Council in April 2014. The revised regulation will extend the ‘stop-the-clock’ suspension of the ETS with respect to flights to and from non-EEA countries until 2016, as well as requiring Member States to report on how they use revenue from ETS allowance auctions.

Although we welcomed the clarity this provided airlines for the next three years, the continual amendments to the regulation added to legislative uncertainty. It also posed an additional layer of complexity for airlines striving to meet regulatory requirements in all markets in which they operate. Despite our opposition, we have been making all the necessary preparations for full compliance with the EU ETS regulation.

### Global Efforts by the Aviation Industry in Reducing Emissions

2008	●	CX as a founding member of the Aviation Global Deal Group
2009	●	The aviation industry committed to new and ambitious targets for emissions reductions through IATA
2010	●	Monitoring of CO <sub>2</sub> data began in compliance with the EU ETS
2011	●	CX appointed to IATA Climate Change Task Force
2012	●	CCTF completed extensive work around the implementation of CNG 2020
2013	●	The 38 <sup>th</sup> ICAO Assembly agreed to proceed with the development of a global market-based measure for international aviation emissions



## 7 Carbon Offsetting – FLY greener

**FLY greener**, Cathay Pacific's carbon offset programme launched in 2007, the first by an Asian airline, is part of our ongoing effort to engage with passengers on climate change issues. They can contribute to projects that reduce CO<sub>2</sub> emissions, and increase their awareness on climate change issues. More information on this programme and the projects we offer, including our unique corporate carbon offset programme for corporate clients, can be found at [www.cathaypacific.com/flygreener](http://www.cathaypacific.com/flygreener) and [www.dragonair.com/flygreener](http://www.dragonair.com/flygreener).

Based on carbon emissions calculated for the specified flights, the attributable monetary contributions go directly to fund third-party validated projects that help to offset the carbon dioxide generated by those flights. All of the projects we offer are certified under the Voluntary Carbon Standard (VCS) to ensure that they are verifiable, credible and make a difference to local communities and the environment.

In 2013, 3,000 tCO<sub>2</sub><sup>^</sup> were offset by our passengers, including several companies in Hong Kong, China, and Taiwan.

Cathay Pacific and Dragonair also offset the CO<sub>2</sub> impacts of staff travelling on business, amounting to 8,000 tCO<sub>2</sub><sup>^</sup> at an approximate cost of HK\$200,000 in 2013.

A summary of carbon emissions offset purchased:

	Passengers	Staff Travelling on Business
2009	3,300 tCO <sub>2</sub>	8,100 tCO <sub>2</sub>
2010	3,100 tCO <sub>2</sub>	12,000 tCO <sub>2</sub>
2011	3,400 tCO <sub>2</sub>	15,000 tCO <sub>2</sub>
2012	2,600 tCO <sub>2</sub>	9,400 tCO <sub>2</sub>
2013	3,000 tCO <sub>2</sub>	8,000 tCO <sub>2</sub>

Current portfolio of projects supported by **FLY greener**:

### Lankou 26 MW Hydropower Project

Run-of-river hydropower project

Dongguan, Guangdong

Feeds into the China Southern Power Grid

### Chaonan Shalong Wind Power Project

Set of 66 wind turbines

Shantou, Guangdong

Feeds into the China Southern Power Grid



Wind turbines at the Chaonan Shalong Wind Project



## 8 Understanding Climate Change Risks

As part of our overall risk management process, this year we started to identify specific issues and events related to climate change that could affect our business. These ranged from severe disruptions brought about by a changing climate, pandemics, resource scarcity and impacts to our supply chain. While this work is still ongoing, our initial findings show that we have some of the contingency plans in place as part of dealing with weather-related disruptions; but also that more work needs to be done to understand the full impact of climate change to our business. We are exploring the use of scenario planning tools and methodologies to assist us in developing our understanding of climate change.

In 2012 and 2013, we not only worked on this issue internally, but also with like-minded companies in Hong Kong through the Climate Change Business Forum (CCBF), of which we were a member. CCBF embarked on a climate change risk study in Hong Kong that was aimed at understanding the appropriate tools and information Hong Kong and its companies need to better prepare to adapt to climate change. The members produced a report entitled, *"The New Normal: A Hong Kong Business Primer on Climate Change Adaptation"*, which identified predictable and calculable risks to business continuity, which would facilitate longer-term analysis of climate impacts and consequent investment in resilience. In particular, it looked at a number of sectors, namely: transport, energy generation, construction, property, finance and manufacturing & supply chain.



The Climate Change Business Forum report

## 9 HKIA Third Runway Proposal

In 2011, the Airport Authority Hong Kong (AAHK) released its 20-year development blueprint for Hong Kong International Airport (HKIA) ("Master Plan 2030") to solicit stakeholder and public feedback on the airport's future development direction, including the construction of a third runway, over a three-month consultation period. Cathay Pacific supports the plans and believes that expansion of the Hong Kong airport is important to the sustainability of the Hong Kong economy and to ensure the long-term competitiveness of our home hub.

In March 2012, the Government of the Hong Kong Special Administrative Region (HKSAR) adopted in principle the three-runway option as the official expansion plan. We welcomed this as the future development blueprint for the HKIA.



We firmly believe the third runway is of critical importance to the sustainability of the Hong Kong economy and, therefore, to the long-term prosperity and well-being of Hong Kong's people. Connectivity with the rest of the world has made Hong Kong what it is today so we must be clear on how we can maintain and grow these links to our future.

**John Slosar**  
 Chairman,  
 Cathay Pacific

In August 2012, the HKSAR Government's Environmental Protection Department (EPD) issued the Study Brief for the Environmental Impact Assessment (EIA) of the proposed third runway. We provided our inputs during the consultation period, with an excerpt of our comments below:

We fully support AAHK's efforts in developing a comprehensive Environmental Impact Assessment (EIA) that fully complies with Hong Kong's regulations, responds to stakeholder concerns, proposes relevant and appropriate mitigation measures and is guided by international best practice. It is also expected that AAHK will ensure that the construction of a 3<sup>rd</sup> runway will be undertaken with the least impact to the environment and that the mitigation measures proposed will be fully implemented.



In 2013, AAHK continued conducting the EIA covering 12 key assessment aspects, which is expected to be completed in 2014. The EIA will be subject to review by the EPD and the public to ensure the requirements set out in the Study Brief have been met before an application for an Environmental Permit can be submitted. Whilst we acknowledge that aviation has an impact on the environment and climate change, the industry is working to ensure that we are also part of the solution in its commitment to achieve sustainable long-term growth, reduce its environmental impact whilst continuing to generate significant benefits for societies, tourism, world trade and economies.

To support the EIA studies, we have provided past emissions/engine performance, air traffic data and future forecast plans to AAHK's consultant team. We are also an active participant in the EIA technical briefing groups dealing with air quality and noise, and provide support on community liaison groups, exhibitions, and public forums.

In addition, under the AAHK's Carbon Reduction Programme, over 40 business partners around the airport community pledged to reduce airport-wide carbon emissions by 25% per workload unit by 2015 from 2008 levels (where one workload unit is equal to one passenger or 100 kg of cargo). As part of the AAHK's community, we fully support this pledge and believe our climate change commitments align with it.

## 10 Our Approach on the Ground

We have been working tirelessly on our ground operations to reduce our carbon footprint, primarily from electricity consumption of our buildings, equipment stock and vehicular emissions.

### Headquarters

Our headquarter buildings, Cathay City and Dragonair House, are based at Chek Lap Kok, near the Hong Kong International Airport. They cover a total floor area of 193,000 m<sup>2</sup> and mainly comprise offices, flight training centres and stores. Both premises are certified to the ISO14001 international environmental management standard. They are both equipped with a building management system. Cathay City also has automatic lighting, air-conditioning controls and motion sensors in conference rooms. In 2013, the total electricity consumption at Cathay City and Dragonair House was 33,677,843 kWh and 6,998,637 kWh respectively, representing a decrease of 7% and 4.1% respectively, compared to an increase of 1.2% and 0.2% respectively the year before. The main reasons for this saving are from the chilled water system optimisation and LED lighting replacements. The Civil Aviation Department and the Cathay Pacific Services Limited vacated Dragonair House toward the end of the year, contributing to a minor reduction in electricity consumption. There is also a 500-room staff hotel, the Headland, adjacent to Cathay City. This is managed separately by Swire Hotels, and therefore falls outside of the scope of this report.

## CX City Renovation Project



As part of the Pioneer Floor Programme spearheaded by the Property Services Department, part of the fourth floor office in Cathay City was given a makeover this year. This programme aimed to revitalise the office environment of Cathay City by introducing a new office layout. The project area consisted of workstations, private offices, meeting rooms, filing/equipment areas, centralised storage areas, printing rooms and pantries. Breakout areas were also introduced to facilitate better collaboration of different teams.

Key energy saving features that were adopted for the pioneer floor included the following:

### Lighting

- The new layout, which consisted of fewer walls, maximises the penetration of natural light from the atrium and windows.
- The existing lighting panels were reused to reduce material wastage. These were modified to hold LED light tubes instead of T8 light tubes. The light-coloured decoration also reduced lighting density in the office. All these resulted in a better lighting performance, greater energy saving, and the need for fewer lighting panels.

### Window Blinds

- Two layers of roller blinds were installed in front of the base building curtain wall, including a layer of solar control and a layer of semi-translucent colour film. These minimised the UV and heat entering the office, and hence reducing the energy required for air-conditioning.

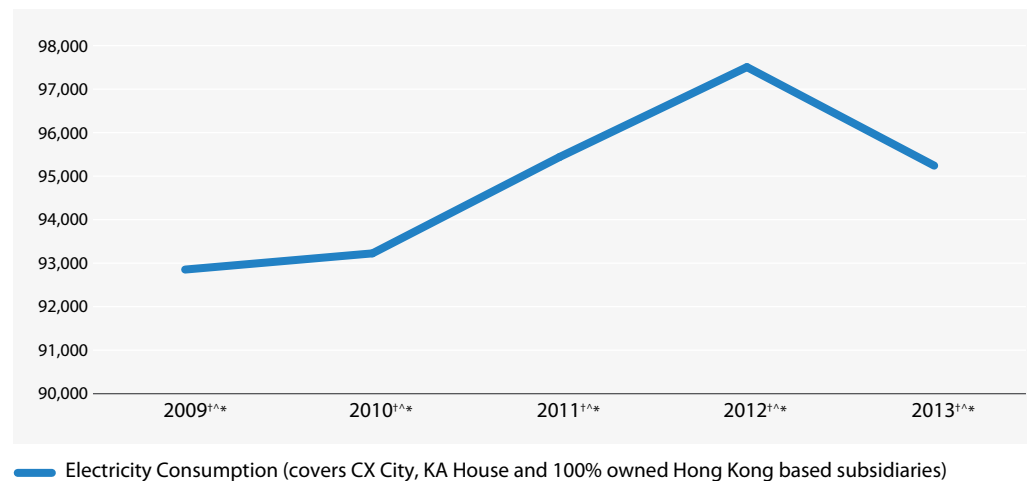
The pioneer floor also featured a number of waste management and resource use initiatives. These are described in the [Waste Management Factsheet](#).

As part of making our buildings more energy efficient, a detailed energy audit for Cathay City and Dragonair House was commissioned and undertaken in 2012/2013. The audit provided an overview of the type, usage, operation, and performance of the key components of the buildings, their historical energy performance, and energy management opportunities.

The findings of this audit will form the basis of refining our energy-efficiency improvement programme and assist us in setting appropriate energy targets. The chilled water system optimisation regime in Cathay City was scaled-up in 2013, and has become an ongoing practice of system operations.

Approximately 10% saving in power could be achieved from the trial of the chilled ceiling panels in the Control Room in Cathay City. However, capital investment to the system modifications currently constrained further application of these chilled ceilings throughout the building.

### Electricity Consumption (kWh) between 2010 and 2013



Together with a dozen other companies in Hong Kong, we signed the World Business Council for Sustainable Development (WBCSD) Building Manifesto for Energy Efficiency in Buildings in 2012, whereby member companies pledge to improve the energy performance of their commercial buildings.



The WBCSD Building Manifesto for Energy Efficiency in Buildings pledging event

At Dragonair House, LED lighting will be used to replace florescent lighting as KA premises are renovated to improve energy efficiency.

### New Cargo Terminal

The purpose-built, fast-connection Cathay Pacific Cargo Terminal, designed for an annual air cargo throughput of 2.6 million tonnes, started its phased commencement in February 2013, and completed the transition in October. The terminal contains many sustainability design features, including the use of a chilled ceiling cooling system at the Terminal's office building, which could save up to 30% in power consumption compared to conventional air conditioning systems, and the use of high performance cladding for the exterior of the Terminal. There are also a number of green initiatives in place, such as the collection of grey water for irrigation and flushing, waste separation at source, and the use of electric vehicles and equipment.

Cathay Pacific Services Ltd continuously evaluates potential areas with a commitment to protect the environment. For 2014, the company aims to reduce paper consumption by 10%, and save more than 1 million kWh of electricity per year by installing power efficient retrofit lamps. The new cargo terminal also plans to introduce motion sensors and photo sensors across the Terminal to minimise unnecessary lighting.



Chilled ceiling air conditioning at the new Cargo Terminal







As a socially and environmentally responsible company, Cathay Pacific Services Limited has incorporated sustainability considerations into daily operations and future development. We are determined to protect the environment and establish a green cargo terminal with a high level of environmental performance.

**Algernon Yau**

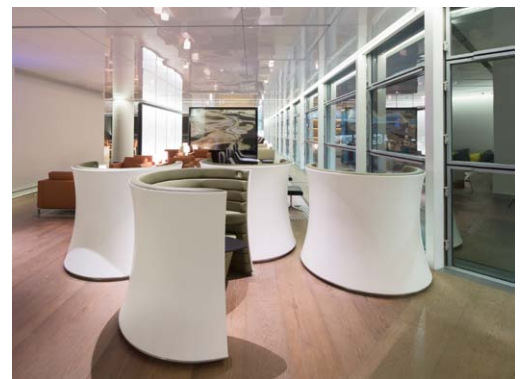
Chief Executive Officer,  
Cathay Pacific Services Ltd.

### Our Airport Lounges – The Bridge

At our newly refurbished airport lounge at the Hong Kong International Airport, The Bridge, an installation has been used whereby waste heat produced from the heating, ventilation and air conditioning (HVAC) system is reclaimed and utilised to achieve energy conservation and minimise electricity consumption at the lounge. This process makes use of energy exchange between the water boiler and the HVAC system. Following several feasibility studies, it was decided that the application of water-to-water heat pump utilising waste heat recovery will be applied due to the significant hot water consumption pattern at the Bridge. Energy saving from using these heat pumps compared with using conventional electrical boilers will be reported next year. LED lights are used throughout the lounge. Toilets are equipped with a dual flushing system to encourage the efficient use of water.



HVAC System at The Bridge



Main Lounge

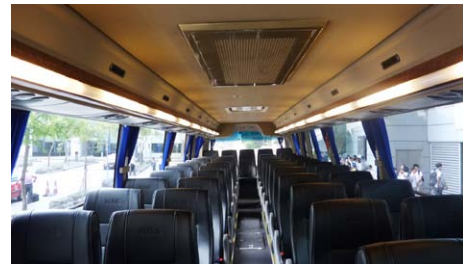
## Our Subsidiaries – Hong Kong Airport Services

Our wholly-owned subsidiary, Hong Kong Airport Services (HAS), has the largest vehicle fleet in the Group, and is the largest ground handling agent in Hong Kong, serving 29 airlines. HAS is committed to reducing carbon emissions from their fleet, and started the first term of a three-year Ground Support Equipment (GSE) Replacement Programme since 2011.

During the first period of this Programme, over 230 aged and less fuel efficient GSE and vehicles were replaced. Currently, 25% of the motor vehicles and GSE is electrically-powered or complies with EURO IV/V emission standards. All newly bought vehicles meet the EURO V standard. The second term of the three-year programme will commence in 2014.



Electric tractor



51-seater shuttle bus

The electricity consumption per thousand air traffic movement (ATM) and fuel consumption per thousand ATM increased by 1.9% and 6% respectively in 2013. The installation of new electric induction cookers at the 24-hour staff canteen contributed to the slight increase in electricity consumed. Due to more flight handling in the outer bay and the North Satellite Concourse at HKIA, vehicular travelling distance increased leading to more fuel consumption per ATM in 2013. HAS also replaced the shuttle buses with larger seating capacities to reduce passenger waiting time; and thus caused an increase in fuel consumption.

HAS launched a Paper Reduction Campaign at the end of December 2012 and targeted to reduce the general paper consumption by 5%. As part of the campaign, telex systems were improved to divert telex messages to email accounts to save telex paper consumption. Electronic devices such as smart phones were introduced to convey flight loading information for frontline operations, which reduced the amount of paper consumed. For 2013, general paper consumption fell by 6.8% compared to 2012.

## Our Subsidiaries – Vogue Laundry Services (VLS)

Vogue Laundry Services is another wholly-owned subsidiary of Cathay Pacific. It employs over 600 staff and serves over 17 airlines, 20 hotels and has a daily output of 277,000 items, equivalent to 79 tonnes of laundry. It is the first laundry in Hong Kong to be certified to the ISO 14001 environmental management standard and the OHSAS 18001 occupational health and safety standard.

Over the past few years, Vogue has been actively exploring ways to reduce emissions through active carbon absorption in the dry cleaning machines and from perchloroethylene, which is a volatile organic compound (VOC) consumed in the dry cleaning process. Consumption of this solvent has been reducing and in 2013, it was 7.0% less than in 2012. Vogue also switched from diesel boiler to a dual fuel boiler utilising Towngas and ultra-low sulphur diesel at a 75:25 ratio, which helped reduce CO<sub>2</sub> emissions. However, due to continuous cold days in 2013, boiler hours increased. The actual CO<sub>2</sub> emission was 3.8% higher in 2013 when compared to the same period in 2012.

Vogue runs a fleet of 29 vehicles for its collection and delivery services. In 2013, one Euro V van was added to the fleet, with a further three Euro II trucks to be phased out in 2014.

## Our Subsidiaries – Cathay Pacific Catering Services (CPCS)

Cathay Pacific Catering Services (CPCS), a 100% subsidiary of Cathay Pacific, serves 41 airlines and is one of the largest flight kitchens in the world. In 2013, CPCS installed cold room plastic curtains for outbound and tray set cold rooms, which reduced 27 tonnes of CO<sub>2</sub> emissions. It also continued to use Towngas as boiler fuel, which reduced 1,600 tonnes of CO<sub>2</sub> emissions. A total of 449 LED light tubes were installed at the new first floor ware wash area, which operates for 12 hours daily, and reduced 12.8 tonnes of CO<sub>2</sub> emissions. In some work areas, the temperature rose by 1°C and reduced 40 tonnes of CO<sub>2</sub> emissions. CPCS's dedicated purchasing team continued to source sustainable seafood. In the vehicle fleet, all pre-Euro type trucks have been replaced and the number of Euro V trucks increased to 16 in 2013.

## Summary of Recent Key Initiatives – Subsidiaries

Company	Initiatives
<b>Hong Kong Airport Services</b>	<p>In 2013, 25% of motor vehicles and Ground Support Equipment is electrically powered or complies with EURO IV/V emission standards.</p> <p>Paper Reduction Campaign reduced general paper consumption by 6.8% in 2013.</p> <p>Seven fast chargers installed, with 10% electricity savings in 2012.</p> <p>Participated in the Clean Air Network Green Drive in 2012.</p>
<b>Vogue Laundry Services</b>	<p>The first laundry in Hong Kong to be certified to the ISO 14001 environmental management standard and the OHSAS 18001 occupational health and safety standard.</p> <p>Dry cleaning solvent consumption reduced by 7% in 2013.</p> <p>Diesel boiler replaced by dual fuel boiler, with a 12% CO<sub>2</sub> emissions reduction in 2011.</p> <p>Continuous phasing out of lower Euro trucks and addition of Euro V vehicles.</p>
<b>Cathay Pacific Catering Services</b>	<p>Air-cooled condensers in blast chillers replaced by water-cooled condensers, with energy saving of 385,440 kWh in 2012.</p> <p>Plastic curtains were installed in the cold rooms to reduce energy consumption.</p> <p>The use of Towngas boilers, installation of LED lights and the raising of temperature in some work areas all helped to reduce overall electricity consumption.</p> <p>Sixteen Euro V trucks in the fleet by 2013. All pre-Euro trucks have been replaced.</p>

## 11 Business and Community Engagement

Engaging with regulators and groups involved in shaping climate change and aviation policy is a key component of our climate change strategy. We work with organisations not only in increasing awareness on climate change issues, but also in developing appropriate solutions for the aviation industry.

**International Air Transport Association (IATA)** – The IATA AGM in June 2009 agreed to commit to new and ambitious targets for emissions reduction. Aviation is the only industry where collective climate change targets have been endorsed by the whole industry at a global level. Specific analysis and actions continue to focus on an equitable global approach to emissions accounting, carbon offsetting, a full range of balanced mitigation measures and investment support for new aircraft. We are also actively involved in the IATA Climate Change Task Force and Environmental Committees through representation by our Head of Environmental Affairs, Mark Watson. In 2013, we joined the IATA Air Cargo Carbon Footprint Working Group, which was newly convened to assess the carbon emissions generated from air cargo and develop industry recommended practice on CO<sub>2</sub> reporting for cargo operations.

**Greener Skies Conference** – CX has been sponsoring this aviation sustainability conference since 2007, and which is supported by IATA, the Air Transport Action Group (ATAG) and the Association of Asia Pacific Airlines (AAPA). The 5<sup>th</sup> conference, held in 2013 in Hong Kong, saw John Slosar, Chief Executive of CX at the time, delivering the opening remarks and Mark Watson, Head of Environmental Affairs, moderating a panel discussion on how the industry can work together to formulate a global solution to reduce aviation emissions, especially in the realm of using market-based measures.

**Climate Change Business Forum (CCBF)** in Hong Kong – We have been an active member of CCBF, a forum for Hong Kong business leaders to collaborate on tackling climate change since 2008. CCBF serves as the Southeast Asia anchor on climate change issues for the World Business Council for Sustainable Development (WBCSD). It is also an international network partner of The Prince of Wales's Corporate Leaders Group on Climate Change (CLG), and is often called upon by these and other groups seeking Asian business leadership on climate change and low-carbon issues. In 2012, its founding Patron Chair, Mr C.Y. Leung, was elected Chief Executive of Hong Kong. CCBF intensified its efforts to offer advice on Hong Kong's transition to a low carbon economy, through both opinion editorials and targeted policy papers. A number of CCBF members demonstrated action leadership by signing a Building Energy Pledge which originated with the WBCSD. Cathay Pacific was one of the first Hong Kong companies to sign the Pledge, which commits signatories to calculate a carbon or energy baseline for commercial buildings; set a reduction target consistent with transformational change; and report annually against that target. This demonstration of collective leadership was welcomed by Hong Kong Secretary for Environment K.S. Wong, and sets the stage for further thought and action leadership in the coming year. In 2013, CCBF became one of four Advisory Groups under the new Business Environment Council structure.

**Sustainable Aviation Fuel Users Group (SAFUG)** – Cathay Pacific is a member of SAFUG, an industry working group united by the desire to accelerate the commercialisation of sustainable aviation biofuels by developing robust, global sustainability criteria and best practices for the aviation biofuels market. SAFUG is working closely with the Roundtable on Sustainable Biomaterials (RSB) bringing together farmers, airlines, fuel producers, government regulators and NGOs to agree on a way forward for obtaining biofuels from responsible and sustainable sources. We subscribe to the sustainability criteria that aviation biofuels must not compete with food and drinking water supplies, biodiversity and local populations.

**Carbon Price Communiqué of the Prince of Wales' Corporate Leaders Group on Climate Change (CLG)** – We signed the [Carbon Price Communiqué](#) in 2012, which defines the international business community's expectations on a carbon price signal – “asserts that one of the main building blocks of a cost-effective, pro-business policy framework for climate change is a clear and transparent price on carbon emissions”. In the past we have signed the [Cancun Communiqué](#) in 2010, urging governments not to wait for one global deal; instead, they should pursue new sectoral, bilateral or regional agreements, depending on their appropriateness and relevance. For example, the Communiqué called for a comprehensive global approach on emissions for aviation and shipping. In 2009, we also signed the [Copenhagen Communiqué](#) calling on world leaders to agree on “ambitious, robust and equitable global deal on climate change.” In 2008, we signed the [Poznan Communiqué](#), which sets out what business leaders believe should be the key elements of an international agreement on climate change.

**Carbon Reporting** – In 2013, for the first time, Cathay Pacific was included in the Dow Jones Sustainability Index (DJSI), a world leading and one of the most recognised sustainability indices. We were also listed in the Carbon Disclosure Leadership Index (CDLI) under the Industrials sector, for having one of the top scores for showing positive actions that the company has demonstrated to promote climate change mitigation, adaptation and transparency.

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