The development and operation of HKIA creates a range of environmental impacts. These include changes in land use, consumption of natural resources, disposal of waste, and carbon, air and noise emissions, all of which may influence human and ecological health and well-being. Many of these impacts are directly measurable and, taken together, represent the ‘environmental footprint’ of HKIA. AAHK is committed to using best practice environmental management, and particularly to working closely with airport business partners to accelerate the rate of footprint reduction.
The 2008 emission factor as provided by CLP Power Hong Kong Limited, AAHK’s electricity provider, was used in the calculation to enable year-to-year comparison of emissions from purchased electricity.

**KEY ACHIEVEMENTS IN 2014/15**

- **CO₂** 22.4%* reduction in HKIA’s carbon intensity compared to the 2008 baseline

- **LED** Completed the installation of 100,000 LED lights, saving 18.2 million kWh per year of energy consumption

- **Food Waste Diversion** Launched the auxiliary power unit (APU) ban to reduce emissions from aircraft at frontal stands

- **Food Waste Diversion** 1,255 tonnes of food waste diverted from landfill

**OBJECTIVES AND TARGETS**

- Upgrade AAHK’s existing Environmental Management System in line with ISO 14001:2015 and consider certification by 2017

- Develop future carbon reduction targets for five and 20 years, and the associated reduction strategies for HKIA in 2015/16

- Complete a comprehensive waste management study in 2015/16 to develop a long-term waste management strategy for HKIA
Q&A Multi-stakeholder Collaboration to Reduce Environmental Impact
- Mike Kilburn, Senior Manager, Environment, AAHK

What role does collaboration with the airport community play in reducing the environmental impact of the airport?

As the airport operator, AAHK has a clear responsibility to take the lead. But with a team of 1,500, we can only do so much in reducing the environmental footprint of an airport with a workforce of 65,000. In order to accelerate the rate of reduction, we need to work with our business partners as we have done with the HKIA Carbon Reduction Programme – over 60% of the airport’s emissions come from 46 of our airport business partners. It’s also important to note that the support and public commitment from top management and senior government officials has been essential to the success of the programme. We are currently exploring how the lessons learned from this first collaborative approach can be further adopted in tackling other aspects of our footprint, such as air emissions and waste.

AAHK has limited ability to control the environmental practices of the airport community. It is even more limited when it comes to the aviation industry. How does AAHK use its influence to drive improvement in environmental performance at HKIA and beyond?

Sometimes it is necessary to elevate an issue to a higher level and engage with a wider group of stakeholders in order to solve it. A good example is AAHK’s approach to encouraging the separation and recycling of aircraft cabin waste. When we first approached the airlines about this, we were told that they would not do it just for HKIA, as it was operationally difficult to follow different procedures at different airports. Recognising these concerns, we began working, first with the Airports Council International (ACI) Asia-Pacific Regional Environment Committee (REC), and then with the ACI World Environment Standing Committee (WESC) and finally with the International Air Transport Association (IATA), the airlines’ industry body, to develop a set of cross-sectoral recommended practices for managing aircraft cabin waste. This document is now in the final drafting stages, and once published, we hope it will provide a framework for improving cabin waste management at HKIA, as well as other airports worldwide.
Approach to Environmental Management

AAHK is committed to using best practice environmental management to minimise HKIA’s environmental footprint. The underlying objectives go beyond cost reduction and resource efficiency to securing the airport’s social license to operate – the public’s acceptance and approval of the airport’s operation and development. AAHK recognises that there is increasing public scrutiny on environmental issues in Hong Kong, particularly on development projects that may have negative environmental impacts, and that the associated risks can be costly. It is therefore important to not only demonstrate that AAHK’s commitment to environmental management leads to continuous improvement in environmental performance, but to proactively engage with stakeholders and the wider public in the process to build trust and credibility.

In the stakeholder engagement exercise conducted for the development of this report, the environmental issues identified as being most important to our stakeholders were: environmental management, carbon and energy management, air quality and waste.

In May 2012, AAHK pledged to make HKIA the world’s greenest airport. The strategy to achieve this is based on the recommendations from an independent Green Airport Benchmarking Study conducted in 2013/14 and AAHK’s Five-Year Environmental Plan (the Plan), which was upgraded from the previous three-year plan in order to better match AAHK’s business planning cycle.

The Plan sets out a range of environmental footprint reduction measures in respect of 11 key environmental aspects. These are climate change/carbon reduction, energy saving, green procurement and retailing, air quality, waste management, water usage, ecology and biodiversity, engagement, noise, new development, and environmental management system.
Stakeholder Perspectives

Edwin Lau, Head of Community Engagement & Partnership, Friends of the Earth (HK):

Taking a flight or buying goods shipped by air have certain environmental impacts not limited to greenhouse gas emissions. Airport operation requires the support of catering, logistics and many other services that put pressure on the environment. AAHK has shown foresight in setting environmental goals that aim to lower its environmental impacts. However, as air traffic continues to increase, we need to consider the growth limit of our city so as to maintain a well-balanced and sustainable society.

Leadership and Engagement

AAHK regularly engages with its business partners at HKIA, the airport community and the wider aviation sector to address environmental issues, particularly where collaboration can accelerate the rate of footprint reduction. The key engagement channels are the Airport Community Environmental Forum and the ACI regional and global environmental committees.

Airport business partners
AAHK engages with airport business partners through the Airport Community Environmental Forum. In 2014/15, four meetings were held, including a visit to Hong Kong EcoPark to review recycling practices and test drives of new EVs. Airport business partners were also invited to share their experiences in adopting new technologies at HKIA, such as the use of solar-powered passenger stairs and electric loaders by Jardine Air Terminal Services (JATS) and the GPS for fleet management by Hong Kong Aircraft Engineering Company (HAECO).

Aviation industry
The ACI Asia-Pacific REC brings together airports in the Asia-Pacific region to solve common environmental issues. AAHK continues to actively support the committee through the participation of AAHK’s Senior Manager, Environment, Mike Kilburn, who was elected as its Chairman in March 2015.

AAHK has initiated two major projects through ACI Asia-Pacific REC – the development of the first environmental survey of the region’s airports, and the establishment of guidelines for aircraft cabin waste management.

The environmental survey results provide the basis for developing a database of ongoing environmental activities and policies in the region and thereby encourage participating airports to learn from one another.

The guidelines for cabin waste management have been developed in a collaboration between the ACI Asia-Pacific REC, ACI WESC, and with IATA, the airlines’ industry body. This collaborative approach is necessary because resolving the coordination between the airlines, the airports, and their various contractors is the key issue. Before drafting the airport section of the guidelines, AAHK initiated a waste handling survey of airports and airlines to understand current practices and develop a standardised approach, which was a key requirement of the airlines.

In addition, AAHK hosted the 4th ACI Asia-Pacific REC meeting in September 2014, in which more than 20 representatives from regional airports participated and shared their views on topics including waste management, aircraft noise and carbon management. The then Cathay Pacific Airways Head of Environmental Affairs, Dr Mark Watson, also shared the airline’s perspective on a range of environmental issues.

Apart from airport business partners, AAHK also engages with suppliers/contractors, regulators, passengers, local communities and environmental NGOs to reduce HKIA’s environmental footprint.
In 2014, AAHK organised the HKIA Environmental Management Recognition Scheme (the Scheme) to encourage airport tenants to embed environmental practices into their daily operation. The Scheme was first introduced in 2012. Waste management was selected as the theme this year to support the HKSAR Government’s effort to address the territory-wide waste problem. Airport tenants were also assessed on other environmental aspects including energy efficiency, water efficiency, wastewater management, air pollution control, and noise pollution control.

At the award presentation ceremony held in March 2015, which was officiated by Wong Kam-sing, Secretary for the Environment, and Fred Lam, CEO of AAHK, 19 restaurants and 23 retail shops were recognised for their outstanding environmental performance. Catalina’s Restaurant and The Magic of Hong Kong Disneyland won the Grand Award in the restaurant and retail categories respectively. The two winners had implemented a range of good environmental practices and demonstrated their commitment for future improvement by developing environmental management plans. AAHK is currently planning to extend the reach of the campaign to airport business partners.

Case Study

HKIA Environmental Management Recognition Scheme

In 2014, AAHK organised the HKIA Environmental Management Recognition Scheme (the Scheme) to encourage airport tenants to embed environmental practices into their daily operation. The Scheme was first introduced in 2012. Waste management was selected as the theme this year to support the HKSAR Government’s effort to address the territory-wide waste problem. Airport tenants were also assessed on other environmental aspects including energy efficiency, water efficiency, wastewater management, air pollution control, and noise pollution control.

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Carbon and Energy Management

HKIA has pledged to reduce airport-wide carbon emissions by 25% per workload unit (WLU)\(^9\) by 2015 based on 2008 levels. In 2014, a 22.4% reduction was achieved. As the existing carbon reduction target ends in 2015, AAHK has engaged a consultant to develop new five-year and 20-year targets and advise on the associated reduction strategies. The study is expected to be completed in 2015/16.

AAHK accounts for approximately 40% of the airport-wide carbon emissions. Electricity consumption is the major contributor. In 2014/15, AAHK’s consumption increased by 5.2% compared to 2013/14. This was mainly due to the increased usage of fixed ground power (FGP) and pre-conditioned air (PCA) systems by aircraft at frontal stand since the APU ban came into effect in December 2014, and the operation of new airport facilities at the western apron and west vehicular tunnel. Nevertheless, electricity consumption per passenger dropped to 4.34 kWh, a reduction of 1.4% compared to 2013/14.

**Electrical consumed by AAHK’s facilities (’000 kWh)**

<table>
<thead>
<tr>
<th>Year</th>
<th>2011/12</th>
<th>2012/13</th>
<th>2013/14</th>
<th>2014/15</th>
</tr>
</thead>
<tbody>
<tr>
<td>kWh</td>
<td>279,157</td>
<td>278,604</td>
<td>266,997</td>
<td>280,777</td>
</tr>
</tbody>
</table>

**Electricity consumption (kWh / pax)**

<table>
<thead>
<tr>
<th>Year</th>
<th>2011/12</th>
<th>2012/13</th>
<th>2013/14</th>
<th>2014/15</th>
</tr>
</thead>
<tbody>
<tr>
<td>kWh / pax</td>
<td>5.08</td>
<td>4.87</td>
<td>4.40</td>
<td>4.34</td>
</tr>
</tbody>
</table>

**HKIA’s carbon management approach**

- **2008**
  - AAHK conducted the first carbon audit of its own buildings and facilities at HKIA, following the release of the Government’s guidelines on GHG reporting.

- **2009**
  - An airport-wide audit, in conjunction with airport business partners, was conducted. This laid the foundation for the airport-wide HKIA Carbon Reduction Programme.

- **2010**
  - AAHK, together with about 40 airport business partners, pledged to reduce airport-wide carbon emissions by 25% per WLU by 2015 based on 2008 levels (i.e. the year in which AAHK conducted the first carbon audit).

- **2011**
  - AAHK developed a proprietary online carbon audit system that provides a carbon monitoring and reporting platform for AAHK and airport business partners.

- **2012**
  - HKIA was awarded the ‘Optimisation’ level in ACI’s Airport Carbon Accreditation programme. The programme is the airport sector’s global standard for carbon management.

- **2013 and 2014**
  - AAHK successfully renewed the accreditation, and extended the HKIA Carbon Reduction Programme to cover more airport business partners at HKIA.

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\(^9\) One WLU is equal to one passenger or 100 kg of cargo.
Waste is one of Hong Kong’s most pressing environmental issues. AAHK focuses on reducing the absolute amount of waste generated and facilitating waste separation at source to promote recycling. AAHK has set a long-term target of recycling 50% of the waste generated at HKIA by 2021. In 2014/15, about 22,000 tonnes of waste were sent to landfill from HKIA and over 3,000 tonnes of recyclables were collected – a recycling rate of around 12.2%.

Compared to the previous year, AAHK has achieved savings in energy consumption and carbon emissions through various initiatives:

- **Completed the replacement of 100,000 LEDs in the terminal buildings in March 2015. The actual saving from the entire replacement project is 18.2 million kWh per year, equivalent to 11,500 tonnes of carbon emissions. This is 20% greater than the saving of 15 million kWh estimated at the start of the project.**

- **Began installation of two high voltage chillers with high Coefficient of Performance (COP) values, which will be completed by July 2016. Higher COP values deliver higher energy efficiency. Upon completion of the project, about 9.8 million kWh will be saved each year, which is equivalent to about 6,200 tonnes of carbon emissions.**

- **Started to replace existing motors for 570 air handling units and ventilation fans in Terminal 1 with high efficiency motors. The replacement project is expected to be completed in the first quarter of 2017, with an estimated saving of 2.6 million kWh per annum, equivalent to approximately 1,600 tonnes of carbon emissions.**

**Waste Management**

In April 2014, AAHK established a Waste Management Task Force, which is chaired by the EDCD and comprises the heads of key departments, to review existing waste management practices and identify possible solutions to reduce waste and promote recycling at HKIA. In April 2015, the task force commissioned a waste management study to assist AAHK in developing strategies and programmes to improve the ongoing waste monitoring and HKIA’s overall waste performance. The study will be completed in 2015/16.

### HKIA’s recycling rate* (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>2011/12</th>
<th>2012/13</th>
<th>2013/14</th>
<th>2014/15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11.3</td>
<td>12.2</td>
<td>12.1</td>
<td>12.2</td>
</tr>
</tbody>
</table>

### Waste sent to landfill (kg / pax)

<table>
<thead>
<tr>
<th>Year</th>
<th>2011/12</th>
<th>2012/13</th>
<th>2013/14</th>
<th>2014/15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.311</td>
<td>0.318</td>
<td>0.349</td>
<td>0.339</td>
</tr>
</tbody>
</table>

### Recyclables collected (kg / pax)

<table>
<thead>
<tr>
<th>Year</th>
<th>2011/12</th>
<th>2012/13</th>
<th>2013/14</th>
<th>2014/15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.040</td>
<td>0.044</td>
<td>0.048</td>
<td>0.047</td>
</tr>
</tbody>
</table>

* HKIA’s recycling rate covers the following recyclables: paper and cardboard, food waste (collected from AAHK’s facilities), plastic, metal and cans, wooden pallets and boxes, glass, waste cooking oil, and chemical waste.
Air Quality

Air quality is a significant public concern in Hong Kong, particularly with respect to its associated impacts on health. While the key emitters of air pollutants at HKIA are aircraft in the landing and take-off (LTO) cycle and the general road traffic, which are outside of AAHK’s direct control, we have established an air quality monitoring system since 2004 and conducted studies to better understand the operational air quality impact of HKIA since 2007. Where AAHK can control or influence the air emission sources, such as the vehicles operating on the airside, we have established standards and procedures to minimise emissions and better manage the air quality.

Air quality monitoring

AAHK adopts a two-pronged approach to air quality monitoring: the development of an inventory of significant emissions sources and the ongoing monitoring of background air quality.

Extension of Food Waste Recycling and Food Rescue Programme

Food Waste Recycling

AAHK has been collecting food waste for recycling since 2003. In 2011, the scope of collection was expanded to cover 17 airport business partners including hotels and airline caterers. Taking advantage of the spare capacity in the food waste collection trucks, AAHK ran a pilot programme in 2014 with Swire Properties and Link to collect food waste in nearby Tung Chung. The pilot programme was successfully completed and AAHK is exploring ways to extend food waste recycling to other organisations and facilities in Tung Chung. In 2014/15, a total of 1,150 tonnes of food waste was converted into fishmeal as a result of this initiative.

HKIA Food Rescue Programme

AAHK started the HKIA Food Rescue Programme in partnership with a local NGO, Food Angel, in August 2013 to collect surplus food from restaurants and caterers at HKIA. Through the HKIA Environmental Fund, AAHK sponsored Food Angel to purchase a refrigerated truck to transport the surplus food and in October 2014, to set up a central storage room at HKIA to collect more surplus food from catering outlets. Four more tenants have joined the programme since the operation of the storage room, bringing the total to 10. In 2014/15, Food Angel collected 17.5 tonnes of surplus food and transformed it into over 20,000 hot meal boxes for distribution to the underprivileged.
Air quality management

AAHK’s approach to air quality management is to reduce air emissions that are under AAHK’s direct control (i.e., emissions related to AAHK vehicles), and to facilitate emissions reduction which AAHK can guide or influence. The latter includes airside vehicles operated by airport business partners and aircraft on the ground.

**AAHK’s own vehicle fleet**
AAHK continues its switch to cleaner vehicles. The number of EV saloons owned by AAHK increased from 37 in 2013 to 43 in June 2015. AAHK also owns 10 single-cab and 20 dual-cab apron passenger buses as well as four airside staff shuttle buses that meet the EURO V emission standard.

**Airside vehicles**
All vehicles driven within the Airport Restricted Area (ARA) are required to obtain an Airside Vehicle License (AVL) issued by AAHK. AAHK has stipulated specifications on emission standards in the requirements of AVL, with which all airside vehicles must comply. Furthermore, since July 2013, AAHK has required all newly registered saloons operating in the ARA to be EVs. By July 2017, all saloons on the airside must be EVs.

In 2014/15, AAHK revised the AVL requirements to dovetail with the new Government regulation on non-road mobile machinery (NRMM). The new Air Pollution Control (NRMM) (Emission) Regulation, which came into force on 1 June 2015, introduces regulatory control on the emissions of NRMM, covering GSE operating on the apron. In December 2014, AAHK invited representatives from the EPD to conduct a briefing for airport business partners to help promote awareness of the new regulation.

To facilitate the transition to EVs and EGSE operating at HKIA, AAHK completed the installation of 158 EV chargers and 56 EGSE chargers in 2014. AAHK will continue to increase the number of EV and EGSE chargers in new development projects such as the Midfield Development.

**Aircraft APU emissions**
Aircraft on the ground normally use their APUs, which are small engines located at the rear of aircraft, to provide electrical power when the main engines are switched off. To reduce emissions from burning jet fuel, AAHK implemented an APU ban in December 2014 that controls the usage of APUs at frontal stands. In order to meet aircraft needs for electrical power and cabin cooling once the ban came into effect, AAHK upgraded all FGP and PCA systems — a total of 136 FGP units and 96 PCA units.

AAHK also worked closely with airport business partners to organise trials and developed an operational procedure for the ban. AAHK conducts regular monitoring to ensure compliance by the operators.

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**Stakeholder Perspectives**

**Alexander Romar,** General Manager Hong Kong, KLM Equipment Services:

Jardine Air Terminal Services supports AAHK’s plan to gradually replace airside vehicles and GSE with electric alternatives where commercially and operationally viable. Over the last five years, we have shown that the transition to using more than 50 units of EGSE, including 10 solar-powered passenger stairs and five fully electric lower deck loaders, for ramp and aircraft handling has a lower total cost of ownership than our previous diesel-based fleet.
Air Quality Study with The Hong Kong University of Science and Technology (HKUST)

Since 2007, AAHK has worked with Professor Alexis Lau, Dr Li Ying and other experts at HKUST to analyse the air quality data and study the operational air quality impact of HKIA. The following two studies were conducted by HKUST in 2014/15.

Airside Vehicle Emissions Inventory

In 2014, HKUST completed a baseline inventory of air emissions associated with the operation of HKIA for the year 2011. The study focused on emissions from airside vehicles and GSE. The findings helped to identify the best opportunities for reduction of emissions that will come from accelerating the retirement of aged diesel vehicles, and replacing them with EVs and other low emission vehicles.

- Breakdown of NOx emissions from airside vehicles and GSE by emission standards -

The study revealed that old diesel-powered vehicles and GSE are the principal sources of nitrogen oxides (NOx) and fine suspended particulates (PM2.5) in the airside fleet. The pre-Euro IV diesel fleet, the majority of which are over 10 years of age, accounts for around 70% of the NOx and PM2.5 emissions of the entire fleet.
In 2014, HKUST began a study on emissions associated with the aircraft LTO cycle below 3,000 feet. This included analyses of the emissions from different phases of the LTO cycle and the mix of CAEP* aircraft engine emission standards. The study findings have provided grounds for further investigation of potential emission-reduction control measures for aircraft on the ground, such as reduced-engine taxiing. The results are shown in the chart below.

The findings underline the opportunities for reducing aircraft emissions during taxi-in and taxi-out where reduced-engine taxiing or new technologies such as TaxiBot or electric aircraft tractors may be applied.

In 2015/16, HKUST will conduct another study on air emissions from the landside and marine transportation from HKIA.
Biodiversity

AAHK recognises the importance that biodiversity and functional ecosystems play in sustaining a high quality of life for the people of Hong Kong. We have a demonstrable duty of care to avoid and minimise adverse impacts on biodiversity during the development and operation of HKIA. Where impacts cannot be avoided, we work closely with regulators and relevant stakeholders to provide appropriate mitigation and compensation.

In 2015/16, AAHK will establish a Biodiversity Strategy that sets out objectives and a framework for conserving biodiversity at HKIA and identifies key priorities for action. It will be used to guide the preparation of a conservation action plan to avoid and minimise impact, and where possible, enhance the sustainability of at risk species and habitats.

The most important among these are: i) terrestrial species, such as the endemic Romer's Tree Frog (RTF), which lives on Chek Lap Kok; ii) marine species that live in the waters surrounding HKIA, such as the CWD; and iii) species such as sharks and reef fish that are sourced outside Hong Kong, but are either consumed in or traded through the city in globally significant volumes.

The 3RS EIA included a very thorough assessment of issues related to CWDs and proposed a multi-pronged approach to ensure that the identified potential impacts on CWDs are avoided, minimised and mitigated to an acceptable level during construction and operation phases. Mitigation measures include the use of non-dredge methods for reclamation, the establishment of a new marine park, managing the SkyPier high-speed ferries by limiting the traffic, diverting the ferry routes and restricting the speed of ferries. Some of these measures will be implemented prior to the 3RS construction works to protect the CWDs and other marine life.

RTFs are not expected to be significantly affected by the 3RS. In 2014/15, a study on the status and population of RTFs concluded that a viable population was still in place. Conservation measures to protect and improve the quality of the species’ key habitat have been developed.

Seafood is an important and popular component of Cantonese cuisine, and Hong Kong is the global centre of the largely unsustainable trade in live reef fish. Through the HKIA Environmental Fund, AAHK has provided funding for ADM Capital Foundation to study and share ways to improve the sustainability of the trade.

In order to reduce the impact of its own consumption, AAHK updated its Sustainable Seafood Pre-order Dining Policy in May 2014. Following a review of best practices as advised by the Environment Bureau and as adopted by other organisations, AAHK has widened the scope of its renamed Sustainable Dining Policy to include black moss, snake, turtle and Tiger Grouper in the list of food items to be avoided.
Noise Management

While noise pollution is the principal environmental issue for many airports, the remote location of HKIA and the fact that most of the flight paths are over the sea ensures that relatively few people are adversely affected by aircraft noise in Hong Kong.

Hong Kong has adopted the Noise Exposure Forecast (NEF) 25 contour for managing aircraft noise impact. This is in line with or, in some cases, even more stringent than the standards adopted by developed countries. Currently, less than 1,000 people reside within the NEF 25 noise contour.

For villages on Lantau covered by the prevailing NEF 25 contour, AAHK has made a commitment to offer the provision of indirect noise mitigation measures (the installation of air conditioners and noise insulating windows) at our cost. We will also offer financial assistance via the Village Home Improvement Subsidy scheme. In addition, AAHK is exploring the feasibility of introducing environmental charges and an incentive scheme to encourage airlines to deploy quieter aircraft.

CAD conducts regular noise measurements in several districts close to the flight paths and monitors the implementation of aircraft noise mitigation measures developed by the Government. More information can be found on the CAD website (page 97). CAD also monitors and handles public complaints related to aircraft noise.