



Civil Aviation Department

Environmental Report 2016



民航處
CIVIL AVIATION
DEPARTMENT

Content

Chapter 1	Foreword	P.1
Chapter 2	Aircraft Noise Management	P.2
	Quieter Arrivals	P.2
	Quieter Departures	P.3
	Restrictions on Noisy Aircraft	P.4
	Noise Monitoring	P.4
Chapter 3	Aircraft Emissions	P.5
	Measures Taken by Airlines	P.5
	Measures Taken by CAD	P.5
Chapter 4	Green Measures in Other Aviation Related Operations	P.6
	Standardized Forms for Various Tariff and Flight Applications	P.6
	Launch of CAD Safety Library	P.6
	Electronic Submission / Approval	P.7
	Electronic Flight Strip System	P.8
	Online Promulgation of Divisional Reference Documents	P.8
	Aeronautical Information Management System	P.9
Chapter 5	Green Housekeeping	P.11
	Energy Conservation	P.11
	Paper Conservation	P.15
	Waste Collection and Recycling	P.16
	Green Procurement	P.20
	Electric Vehicles	P.21
	Training and Communication	P.21
	Recognition	P.23
	Views and Suggestions	P.24

1 | Foreword

This Environmental Report covered the environmental performance of the Civil Aviation Department (CAD) in 2016.

In the work of environmental management, the Department strives to minimize the disturbance caused by aircraft operations to the local communities and pursue environmentally friendly operations both in various functional areas and office management.

Our Environmental Goals

CAD is committed to ensuring that all services provided by the Department as well as our operations are conducted in an environmentally responsible manner.

Our Environmental Policy

We support the Hong Kong Special Administrative Region Government's initiatives to improve the environment by:-

- Committing to a safe, efficient and sustainable air transport system in Hong Kong;
- Compliance with relevant environmental protection ordinances;
- Striving to minimize the adverse effect that the development of the aviation industry may cause to our quality of life and environment;
- Promoting waste reduction, recovery and recycling, and reduction in consumption of resources including material, fuel and energy; and
- Providing environmental education and training to staff.

2 | Aircraft Noise Management

CAD is conscious of the impact of aircraft noise on the community and has implemented a series of noise mitigating measures. We have also monitored the implementation of these noise mitigating measures and the aircraft noise situation in various districts with the aid of a computer-based Aircraft Noise and Flight Track Monitoring System.

Quieter Arrivals

Arrivals from Southwest over Water

Subject to weather and safety conditions, arrival aircraft between midnight and 7 am are required to approach from the southwest over water. This measure aims to reduce the number of aircraft overflying populated areas such as Shatin, Tsuen Wan, Kwai Chung, Tsing Yi, Sham Tseng and Tsing Lung Tau.

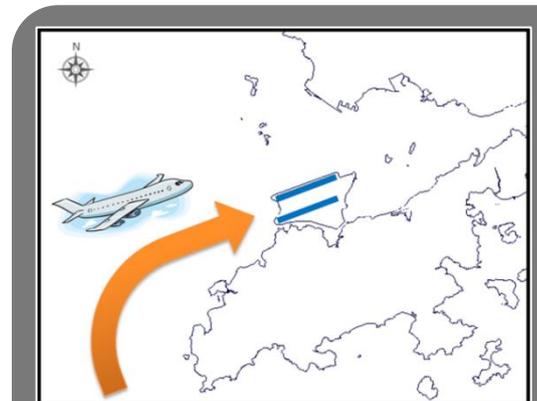


Figure 2-1: Route of arrival aircraft from southwest at night

Continuous Descent Approach Procedure

When weather and safety conditions do not allow night arrivals to approach from the southwest, arrival aircraft from the northeast direction are encouraged to adopt the Continuous Descent Approach (CDA) procedure.

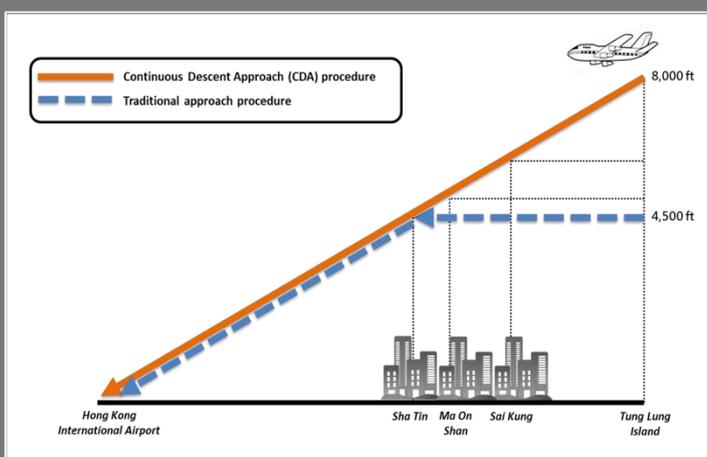


Figure 2-2: Diagram illustrating CDA procedure

The CDA procedure requires the aircraft to fly higher and adopt a lower power and drag configuration during the commencement of the approach, thereby reducing aircraft noise impacts to areas such as Sai Kung, Tseung Kwan O and Ma On Shan.

Quieter Departures

Noise Abatement Departure Procedures

All aircraft departing to the northeast are required to adopt the Noise Abatement Departure Procedures stipulated by the International Civil Aviation Organization (ICAO) so long as safe flight operations permit.

These procedures require aircraft to reduce power upon reaching an altitude of 800 feet or above, thus can alleviate aircraft noise impact during take-offs on communities in the vicinity of the airport.

Departures via West Lamma Channel

Subject to weather and safety conditions, aircraft taking off to the northeast between 11 pm and 7 am the following day are required to fly south to the West Lamma Channel, thereby avoiding flying over populated areas such as Kowloon, North Point, Shau Kei Wan and Chai Wan. Our statistics showed that most aircraft complied with this requirement.

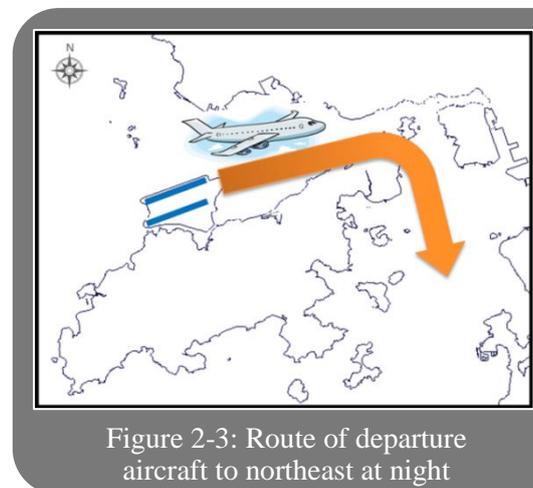


Figure 2-3: Route of departure aircraft to northeast at night

Improving Track Adherence

We have introduced a set of new noise mitigating departure procedures which make use of satellite-based navigation technology for noise mitigation. Aircraft which are equipped to use the technology, when departing to the northeast of the Hong Kong International Airport (HKIA), can make use of the on-board navigation capabilities to achieve higher track-keeping accuracy during their turn to the West Lamma Channel. With better adherence to the designated flight path, the aircraft can be kept at a distance from the populated residential areas. In doing so, the aircraft noise footprint can be confined and the overall aircraft noise effect on these residential areas can be reduced.

Restrictions on Noisy Aircraft

All noisy aircraft which do not comply with the noise standards stipulated in Chapter 3 of Annex 16, Volume I, Part II to the Convention on International Civil Aviation (Chapter 3 Noise Standards) are not allowed to operate in Hong Kong.

To further alleviate the aircraft noise impact on local communities, commencing from end of March 2014, CAD ceased to allow airlines to schedule aircraft whose noise levels only marginally meet the Chapter 3 Noise Standards (so-called “Marginally Compliant Chapter 3 aircraft”) to operate between 11 pm and 7 am the following day. This measure has been extended to cover the whole day since end of October 2014 up to present.

Noise Monitoring

CAD has installed an Aircraft Noise and Flight Track Monitoring System to monitor the implementation and effectiveness of various noise mitigating measures, and the noise environment in various districts. The system comprises 16 outdoor noise monitoring terminals located in the vicinity of the flight paths and a central computer server which correlates the flight data provided by radars and the noise data recorded by the noise monitoring terminals.



Figure 2-4: Outdoor noise monitoring terminal

3 | Aircraft Emission

Most aircraft operating at the HKIA comply with the engine emission standards as stipulated in Annex 16, Volume II to the Convention on International Civil Aviation. With the growing attention to the climate change caused by the greenhouse gas (i.e. carbon dioxide), CAD has been closely monitoring the development of guidelines from ICAO on the reduction of carbon dioxide emission from aircraft operations and conveyed the guidelines to the industry.

Measures Taken by Airlines

Airlines have taken the initiative to retire and replace old aircraft with new models which are more fuel efficient hence less emissions. Apart from the modernization of aircraft fleet, airlines also endeavour to reduce emissions through reduction of aircraft weights, better maintenance and improved flight planning and management.

Measures Taken by CAD

Being the air navigation services provider, we have from time to time reviewed the air routes and air traffic management arrangements by making reference to the latest ICAO guidelines. Taking advantage of the latest development in satellite-based navigation technologies, CAD has conducted enhancements of the air route system which enabled shortened travelling distances and allowed more aircraft to fly at optimum and fuel efficient altitudes, thereby achieving fuel savings and a reduction of carbon dioxide emission.

CAD would continue to keep in view the development of the latest ICAO flight procedure criteria, progressively apply more advanced aviation technologies as appropriate and closely work with other air traffic control authorities and the airline operators for further enhancing the air route system in the Hong Kong Flight Information Region.

4 | Green Measures in Other Aviation Related Operations

CAD recognizes the importance of environmental protection. We have implemented various green measures in aviation related operations. We would continue to explore means to infuse green measures into our operations to maintain sustainability of civil aviation.

Standardized Forms for Various Tariff and Flight Applications

Exchange of correspondence and submission of documents in relation to various tariff and flight applications to the Air Services Office involve considerable consumption of paper and processing time. By the use of standardized forms for various types of applications, the required information and details can be provided in pre-set formats. This arrangement streamlines the processing procedures and avoids excessive emails and letter exchanges and thus reduces paper consumption. Furthermore, e-filing is available for some of the standardized forms which, in addition to reducing paper consumption, also greatly enhances the readability and accuracy of the information provided.

Launch of CAD Safety Library

The CAD Safety Library launched in December 2016 provides a centralised electronic platform for easy storing, sharing and distribution of documents. It allows all divisions and offices to store and retrieve documents in the CAD Safety Library which is readily accessible through office desktop or laptops connected to CAD intranet. Distribution and circulation of documents can also be made through the CAD Safety Library and automated email notifications which reduce the need for printouts and paper copies.

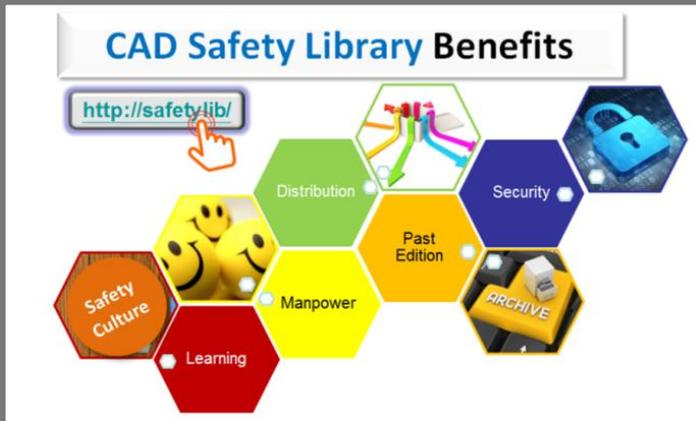


Figure 4-1: Diagram showing the benefits of CAD Safety Library

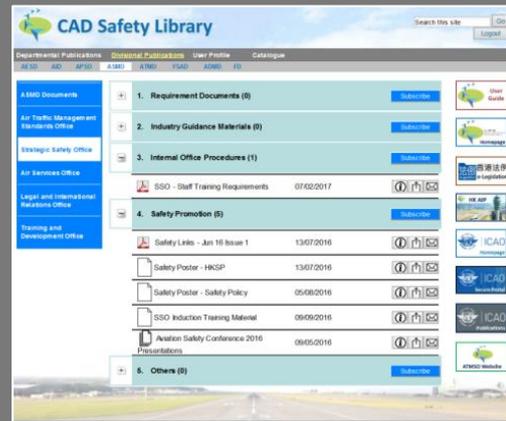


Figure 4-2: Layout of CAD Safety Library

Electronics Submission / Approval

Use of Electronic Flight Bags

CAD has promulgated to airlines that upon the fulfillment of safety related requirements, most document records, manuals and licenses that used to be carried on board aircraft or submitted to CAD in paper form, can be provided through electronic means.

Up to end of 2016, two major airlines in Hong Kong have been approved by CAD to use electronic flight bags in their flights of particular aircraft types to and from Hong Kong. This practice greatly replaces and reduces paper-based references found in the carry-on flight bag in the past, including various operations manuals, maps and navigational charts. With the use of electronic flight bags which brings the technological advances of computer information delivery to the airplanes, flight crews can perform different management tasks more efficiently with less paper.

Application for Guided Tours of the Aviation Education Path

Any group interested in a guided tour of the Aviation Education Path in CAD Headquarters may download the application form from CAD website and submit the duly completed form by electronic means.



Figure 4-3: Aviation Education Path

Electronic Flight Strip System

For a long time, paper flight progress strips had been used by CAD in the Air Traffic Control Tower and the Air Traffic Control Centre. With the commissioning of the new Air Traffic Management System in November 2016, the use of paper strips has been totally replaced by the Electronic Flight Strip System which displays flight data on a screen and allows data management by electronic means.



Figure 4-4: Traditional paper flight progress strips

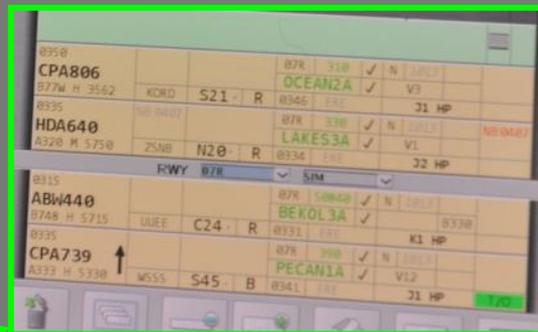
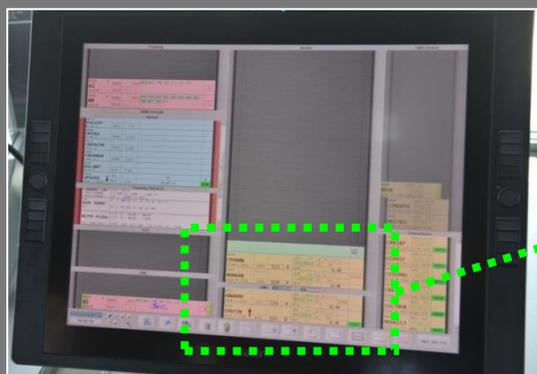


Figure 4-5: Display of the Electronic Flight Strip System

Online Promulgation of Divisional Documents

The Air Traffic Management Division of CAD has launched a website with secured access limited to divisional staff, named as the “ATMD Information Dissemination Website”, since 1 September 2014. The website was at first used to disseminate roster information to colleagues through the internet. Since December 2014, the function of the website was extended to house and disseminate training materials, airport circulars, divisional information circulars and materials of professional interest aiming to replace the traditional means of distributing hard copies.

In order to reap further environmental benefits, since 2015, the use of the website has been extended to provide online access to divisional reference documents and their updates which used to be disseminated by CD-ROMs. As a result of this initiative, about 2,000 CD-ROMs were saved in 2016.

Aeronautical Information Management System

With the commissioning of the Aeronautical Information Management Centre in the CAD Headquarters, a new Aeronautical Information Management System has replaced traditional paper based information management. Aeronautical data is stored in the new system in digitized and structured formats, which enables further processing and distribution by electronic means. The new system not only enhances the accuracy, efficiency and quality of information dissemination, but also helps reduce paper consumption.

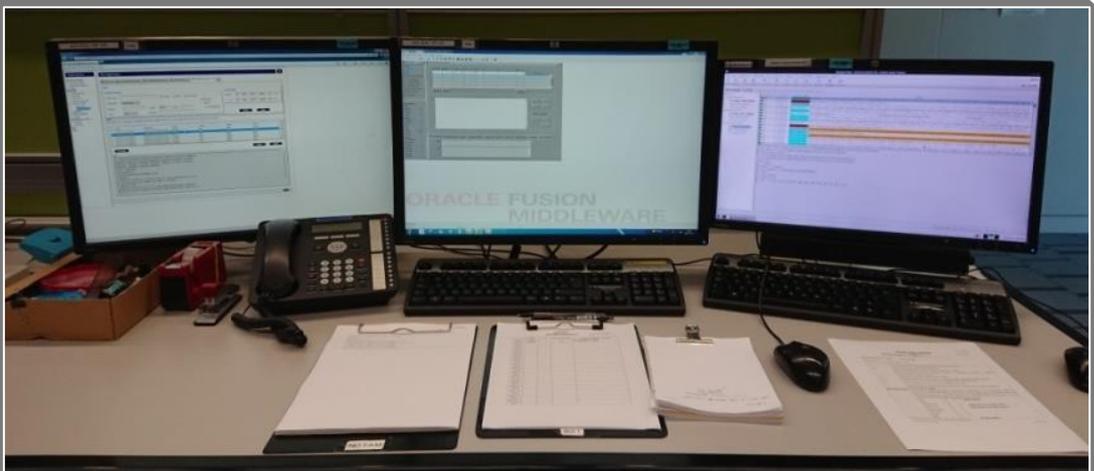


Figure 4-6: An Aeronautical Information Management System Workstation

Graphical Presentation of Aeronautical Information

Before the implementation of the new system, when graphical presentation of information on special areas affecting flight operations was required, our staff would make hard copies of the charts, then manually plot the areas on the charts after detailed measurement. At times, several drafts were made during the plotting process and several sheets of charts were required when the area covered more than the extent of one chart. Subsequently, the plotted paper chart would be sent out by fax or delivery. Not only did the process require more time and effort, it was also not environmentally friendly.

Provisions under the New System

The new system has a graphical report tool which enables operators to input the geographical coordinates of areas concerned and instantaneously display the areas on the screen. Operators can select to display essential elements in the background to make a clear presentation in a paperless environment. An electronic copy of chart can be easily generated and sent out via email efficiently. It is much more user-friendly and can save paper.

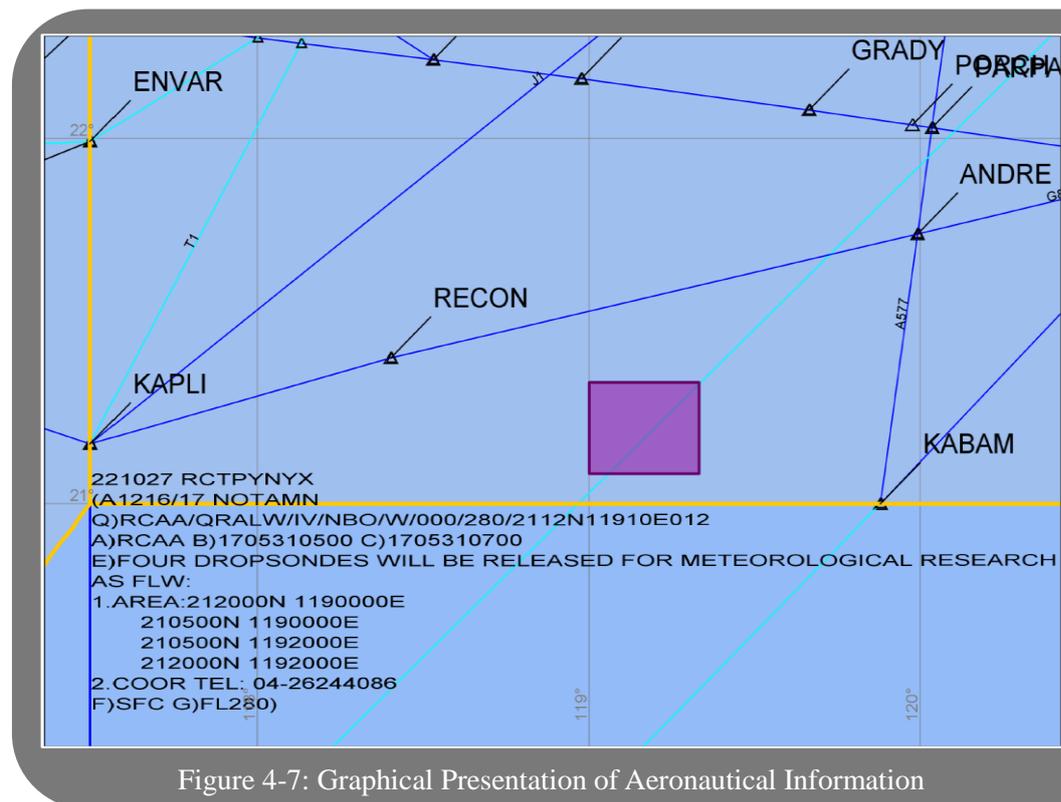


Figure 4-7: Graphical Presentation of Aeronautical Information

Taking advantage of the functionality of the new system, CAD will continue to explore new initiatives to disseminate and exchange information in an environmentally friendly manner.

5 | Green Housekeeping

CAD has implemented a number of green housekeeping measures in daily office operations to encourage energy conservation, paper conservation, waste collection and recycling, proper disposal of environmentally hazardous waste, green procurement and environmental awareness among all staff.

Energy Conservation

Daily Energy Saving Measures in Housekeeping

CAD has adopted a series of green measures in order to minimize the consumption of energy in our daily office operations:-

- Continuing to follow the Government recommended summer air conditioning setting of 25.5°C and use electric fans to improve air circulation and provide better staff comfort if necessary;
- Continuing the practice of switching off any air conditioning, interior lights, exterior lights, decorative lights, lifts, escalators, digital signage system, video wall, etc. when not in use;
- Fine-tuning the external lighting on-off hours periodically to optimise against seasonal changes in light / dark hours;
- Removing some unnecessary fluorescent tubes in the corridors of the Air Traffic Control Complex (ATCX);



Figure 5-1: De-lamping in common area



Figure 5-2: Fluorescent light tubes were removed alternately at the corridors

- During non-peak office hours, switching off some lifts in CAD Headquarters, ATCX and Back-up Air Traffic Control Complex (BATCX) for energy-saving;
- Outside normal office hours, operating limited lifts; lighting under night mode and suspending service of escalators in the Office Building of CAD Headquarters;
- Encouraging staff to use staircases instead of lifts;
- Installing energy-saving timer devices in most share-used printers and photocopiers to prevent the consumption of electricity in standby mode during non-office hours;
- Checking lights and electrical appliances during security patrol outside office hours to ensure that they are switched off if not in use;
- Displaying notices in all meeting / training rooms to remind users to switch off lights and all electrical appliances before leaving;
- Installing solar films in strategic locations to reduce sunlight and heat;
- Introducing green installation during the building construction, e.g. installing photovoltaic panels on the rooftop of CAD Headquarters. In 2016, the electricity generated by the panels was 20,460 kWh; and
- Reviewing the occupancy patterns in CAD Headquarters before the summer season, to optimize the operation schedules of air-conditioning supply for different zones for further reduction of the operation hours of air-conditioning and the overall cooling (energy) demands.

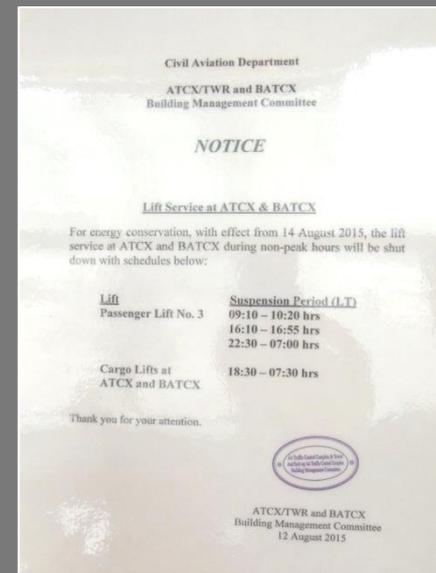


Figure 5-3: Some lifts in ATCX and BATCX are switched off during non-peak office hours



Figure 5-4: energy-saving timer devices connected to photocopiers



Figure 5-5: An example of showing the effect of solar films shielding the office area from sunlight effectively (glass panel on the right without solar film installed)



Figure 5-6: Photovoltaic panels on the rooftop of CAD Headquarters

Electricity Consumption of CAD Buildings

Electricity consumption of our government buildings in financial year (FY) 2016-17 as compared with FY 2013-14 as baseline is tabulated below:-

	Electricity consumption (kWh)	Electricity consumption under comparable operating conditions (kWh)
FY 2013-14 (baseline)	26,590,970	Not applicable
FY 2014-15	27,090,851 (+1.9%)	27,103,123 (+1.9%)
FY 2015-16	26,080,028 (-1.9%)	26,094,576 (-1.9%)
FY 2016-17	24,370,751 (-8.3%)	24,384,915 (-8.3 %)

Remark: Figures in brackets indicate percentage change compared with the baseline.

As set out above, the electricity consumption of our government buildings in FY 2016-17 has decreased by 8.3%, when compared with FY 2013-14 (baseline), under comparable operating conditions. This was mainly due to our effective implementation of energy-saving initiatives.

Energy Audit: Findings and Recommendations

In response to the 5% energy saving target in government offices announced by the Chief Executive in the 2015 Policy Address, an energy audit exercise was kicked off in 2015. A consultant was appointed to conduct energy audits for the major CAD premises including the CAD Headquarters, ATCX and BATCX. The Department has all along been implementing various energy-saving measures. In the consultant reports issued in 2016, it is recommended that the measures should be continued. As specifically mentioned in the energy audit reports, the following energy saving initiatives are recommended to be implemented/maintained based on site conditions:-

- Keeping temperature setting to 25.5°C for all air-conditioning installation;
- Labelling zone control plans near the switches;
- Lowering or closing the blinds to avoid direct sunlight;
- Switching off the electrical appliances when the facility is unoccupied; and
- Keeping lights off alongside windows, as far as practical.

Energy Optimization System

An intelligent control system, Energy Optimization System (EOS), has been installed at CAD Headquarters since late 2015 to execute the optimized control algorithms and collaborate with the existing Central Control and Monitoring System, for continuous review and optimize the operation of the air-conditioning system based on the real-time cooling demands and the external weather conditions.

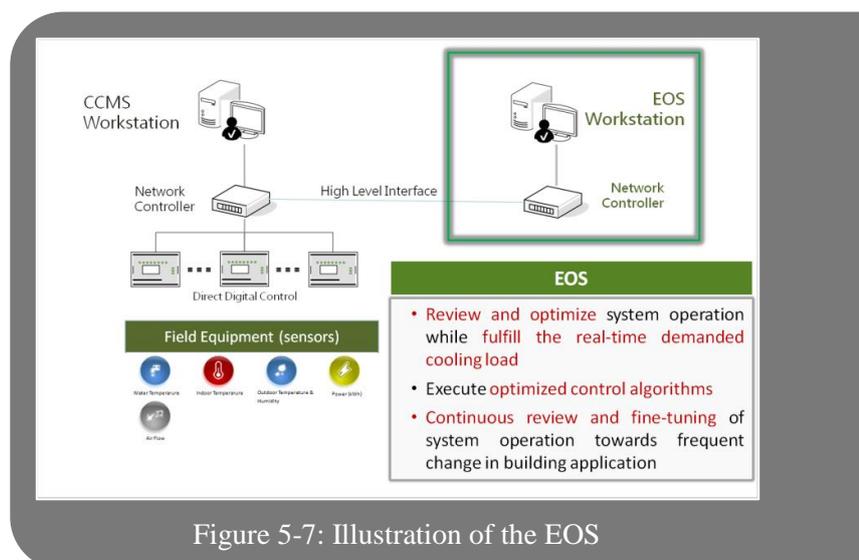


Figure 5-7: Illustration of the EOS

Paper Conservation

Daily Paper Saving Measures in Housekeeping

We promote the “4-R principle” in paper conservation as summarized below:-

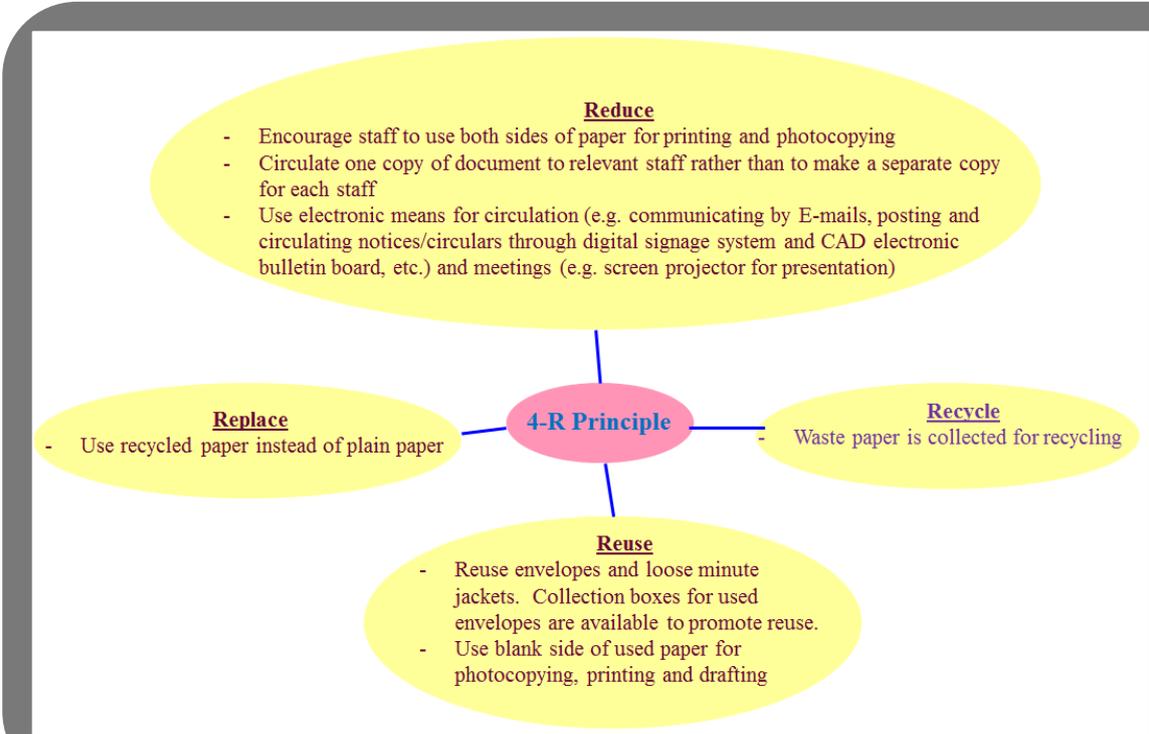


Figure 5-8: Diagram showing the 4-R principle

Paper Consumption for the Recent Three Years

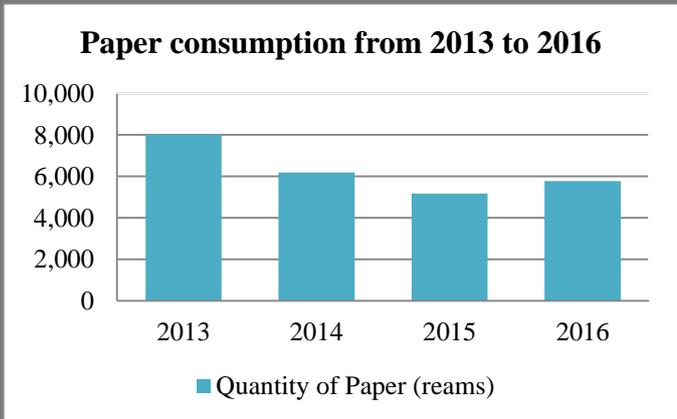


Figure 5-9: Paper consumption from year 2013 to 2016

The paper consumption data of CAD for the recent four years is shown in the Chart. The slight increase in consumption for 2016 was mainly due to the activities arising from various preparation work and training for implementation of the new Air Traffic Management System in late 2016.

Waste Collection and Recycling

Recycling Bins to Collect Waste Paper, Plastic Bottles, Aluminium Cans and Rechargeable Batteries

We collect waste paper, used plastic bottles, metal cans and rechargeable batteries, etc. for recycling. Recycling bins are placed in common areas to facilitate disposal by staff and visitors. The materials collected are delivered on a regular basis to recycling operators. The table below shows the amount of recyclables collected in 2016.

Recyclables	Amount Collected
Waste Paper	3,023.5 kg
Plastic	28 kg
Metal	34 kg
Rechargeable Batteries	29 pieces



Figure 5-10: Collection box for rechargeable batteries



Figure 5-11: Recycling bins

Food Waste Collection and Decomposition System

Food waste is one of the major solid wastes in Hong Kong. Reduction of food waste is therefore crucial for minimizing the load of landfills. To work towards this goal, a food waste decomposition system had been installed in CAD Headquarters.



Figure 5-12: The food waste decomposition system in CAD Headquarters



Figure 5-13: Food waste is collected in CAD Staff Canteen

A food waste collection box is placed in the CAD Staff Canteen at CAD Headquarters for collecting customers' food wastes, which are then disposed of into the food waste decomposition system. During the decomposition process, the food waste is converted by enzyme into liquid, part of which is used as a natural fertilizer for the vegetation at CAD Headquarters and the remaining is discharged as an effluent. In 2016, we collected about 5.3 tonnes of food waste.

Reduction of Waste in Staff Canteen

Besides handling the food waste collected through the food waste decomposition system, the Staff Canteen has taken actions to reduce other solid wastes through the following means:-

- Paper packages for re-usable chopsticks are no longer in use;
- Backing sheets for the food trays are not provided;

- Encourage customers to request a smaller portion of rice, thus reducing the chance of creating food waste; and
- Publicity materials are posted in the Canteen to remind customers to reduce the amount of left-over food.



Fig 5-14: Publicity display in CAD Staff Canteen reminding customers not to waste food

Food Wise Charter

We have joined the Food Wise Charter organised by the Environmental Protection Department since 2016. Upon joining the Charter, measures on food waste reduction are being reviewed. Communication among the management, staff and the Staff Canteen operator is maintained through the regular Canteen Sub-committee meetings.

Collection of Rain Water Recycling for Irrigation

Rain water and air-conditioning condensate water is recycled for the irrigation system installed at CAD Headquarters. The following table shows the saving of irrigation water in 2016:-

Buildings of CAD Headquarters	Facilities Building	Office Building	Air Traffic Control Building
Annual Irrigation Consumption (L)	6,002,315	1,485,079	2,560,988
Annual Recycled Water Collected for Irrigation (L)	2,189,600*	231,600	468,100
Percentage of Saving	36%	16%	18%

* Including the water recycled from the cooling tower.

Water Saving Measures

Fresh water is a precious natural resource. We encourage our staff to actively reduce their water consumption by the following:-

- Bottled water is not provided during internal meetings. For seminar and conferences involving guests, water dispensers are placed in the meeting venues for their refilling; and
- Notices are posted in pantries to remind colleagues to save water.

Bring Your Own Cup

We encourage colleagues to bring their own cups when attending internal meetings, in order to minimize the waste generated from disposable paper cups.

Reduction of Procurement of Newspapers

Newspaper cuttings were circulated by electronic means instead of hardcopies. It is estimated that about 46,000 sheets of paper was saved in 2016.



Figure 5-15: A notice reminding colleagues to preserve water resources

Electric Vehicles

To ameliorate the air pollution problems in Hong Kong, electric vehicles are becoming more widely used in the territory. CAD commenced to replace our petroleum saloon vehicles with electrical vehicles. Among our existing fleet of six saloon vehicles, two-third of them are electric vehicles.



Figure 5-17: The electric vehicles of CAD

Training and Communication

Environmental Management Committee

The Environmental Management Committee (EMC) was chaired by the Departmental Green Manager and comprised of representatives from all divisions of the Department. It was established to recommend environmental goals, policy objectives and targets and to promote environmentally responsible management within the Department. To achieve this, the Committee would meet regularly to consider green initiatives, promote staff awareness, monitor and report on the implementation of green measures.

Appointment of Green Manager and Energy Wardens

A green manager was nominated from each division to coordinate and oversee green management issues. Energy Wardens were also appointed to promote and remind staff to comply with green housekeeping and energy-saving measures in the workplace. Regular briefings were provided to Green Managers and Energy Wardens on various energy saving measures.



Figure 5-18: Group photo of the Departmental Green Manager, EMC Members, Green Managers and Energy Wardens at the briefing on 6 September 2016

Energy Conservation Talk



Figure 5-19: Snapshot of the energy conservation talk on 6 September 2016

We invited CLP Power Hong Kong Limited to conduct an energy conservation talk. Useful energy saving tips in the workplace and household environment were introduced. Colleagues learnt a lot of valuable advice and information in the talk.

Green Tips to all CAD Staff

A Green Corner was established in the CAD electronic bulletin board. It serves as a platform to share among CAD staff guidelines related to environmental management and green tips, such as circulars and pamphlets on energy saving measures, waste avoidance practices in office, etc. The related information will also be recirculated to staff regularly. Divisions are also encouraged to post up the green tips and housekeeping measures at prominent places in the office area.

Training for New Recruits

A briefing session on green management has been included in the orientation programme for new recruits to ensure a good understanding and compliance to departmental green policies and practices among them.

Promotion in the CAD Link

To raise the awareness of our colleagues towards green management and energy saving, news and messages in relation to environmental management are disseminated and promoted in our departmental newsletter – CAD Link regularly.

Recognition

Indoor Air Quality

We support the commitments under the Clean Air Charter. As mentioned in the previous chapters, we have been implementing measures to reduce emissions from our daily operation.

The Indoor Air Quality (IAQ) of CAD premises is assessed annually to monitor the situation. In 2016, the CAD Headquarters obtained the “Excellent Class” of the IAQ Certificate, while the ATCX and BATCX were awarded the “Good Class” IAQ Certificate.



Figure 5-20: The IAQ Certificates obtained in 2016

Views and Suggestions

CAD Environmental Report in the previous years can be found in the CAD website (http://www.cad.gov.hk/english/er_report.html). We welcome comments and feedback from readers so that we could identify ways for improvements. You can provide your views and suggestions to us by the following means:-

General Enquiry

Address : Civil Aviation Department
Civil Aviation Department Headquarters,
1 Tung Fai Road,
Hong Kong International Airport,
Lantau, Hong Kong

Contact no. : 2910 6352

Fax : 2910 6351

Email : enquiry@cad.gov.hk

Website : www.cad.gov.hk