

HKUST Environmental Report 2007 Update



 香港科技大學健康、安全及環境處
HEALTH, SAFETY AND ENVIRONMENT OFFICE
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

Working towards a sustainable future is a task that concerns everybody. This report illustrates how our campus community has been working together to accomplish this important goal.

1 Gold Wastewi\$e Award

HKUST successfully fulfilled the target set by the Wastewi\$e Scheme and was once again awarded the "Gold Wastewi\$e Logo" in the year of 2007. In addition to various waste reduction and recycling efforts, this year's focus was on used items, which were collected by HKUST for charity purpose. The University successfully increased the quantity of used items collected by 47% from 5,800kg in the year of 2006 to 8,500kg in the year of 2007.



Used Items Collected



2 Waste Recycling and Minimization

2.1 The amount of used plastic collected increased from 3,041kg in the year of 2006 to 3,159kg in the year of 2007, representing a 4% increase.

Used Plastic Recycling



2.2 The number of printer cartridge collected in the year of 2007 was 1661. It indicated a slight increase of 1% in comparison with the year of 2006.

Printer Cartridge Recycling



2.3 We continued to collect waste paper, aluminum cans and rechargeable batteries. The total quantities collected were:



Waste paper:
179,010kg

Aluminum can: 174kg

Rechargeable battery:
315 pcs

2.4 In the year of 2007, the quantity of food waste collected and converted to fertilizer/soil conditioner was 14,400kg.

2.5 Collection of used CDs for recycling continued. A total of 3,045 used CDs were collected in 2007.

2.6 Unwanted chemical reagents were given to chemical users of HKUST or users of other local tertiary institutions free of charge. In the year of 2007, a total of 47 items were given out, indicating an 18% increase in comparison with the year of 2006.

- 2.7 The Staff Association continued to organize the collection of used moon-cake boxes for recycling after the Mid-Autumn Festival.
- 2.8 Garage Sale was organised by the Facilities Management Office (FMO) in June and December 2007.
- 2.9 Collection of waste materials for recycling was organised in the student halls during the check-out periods in January and May.
- 2.10 Old book sales were organised jointly by the student societies and the Student Affairs Office (SAO).
- 2.11 The web page storage size of each student society was enlarged with an aim to facilitate students' web-based promotion and communication, and at the same time save paper.

3 Resource Conservation

- 3.1 The third energy performance contract for the laboratory building ended in the year of 2007. This reduced 560 Mega Watt Hours (MWH) in 2007, translating into savings of \$500,000 and avoidance of 297 tons of CO₂ emission.
- 3.2 Waste heat of chiller condensing water was recovered for Library dehumidification and consequently saves \$130,000 per year.
- 3.3 529 sets of energy efficient lamps were adopted to replace aged and less energy efficient counterparts in Academic Building areas. This replacement, plus ongoing lighting optimization by fine-tuning of lighting operation hours and illumination levels, saves \$101,000 per year.
- 3.4 One energy saving device was added for 30 discharge lamp sets, saving \$16,000 per year.
- 3.5 With the use of service-on-demand control, two escalators stop when there are no passengers. It saves \$4,000 per year.
- 3.6 130 no. spring-return type chilled water valves were installed to replace existing floating-type valves for automatic closing off of chilled water supply to fan coil units during scheduled power off period. The replacement further reduces pumping energy by 156kWh per day during hot season.
- 3.7 Trial variable speed drive control was installed for one virtual stack fan to reduce fan speed and energy during low emission period overnight.
- 3.8 2,500 no. of fan coil unit thermostats with digital display were installed to replace existing mechanical counterpart. It provides better temperature control and enhances occupants' energy saving awareness.

4 Green Building Design

- 4.1 Building Energy Codes will be adopted for all new buildings.
- 4.2 Service-on-demand escalators, sensors electronic ballast, T5 fluorescent tubes and digital power monitoring meters will be adopted for the Library extension project and the new student hall.
- 4.3 Central instantaneous gas water heating system with intelligent control, plus solar water pre-heating system will be adopted for the new student hall.

5 Indoor Air Quality

Annual Indoor Air Quality (IAQ) Certificates (Excellent Class) for Library and the S H Ho Sports Hall as well as IAQ Certificates (Good Class) for lecture theatres and computer barns were renewed by the Environmental Protection Department (EPD).

6 Sustainable Practices

- 6.1 Trial solar-boosted heat-pump water heater project continues.
- 6.2 6 no. solar-powered LED lamps were mounted flush with the road side of the Piazza.
- 6.3 A new trial pilot project for CO₂ heat pump will be implemented.

7 Assessment of Sustainability Practices at HKUST - Summer 2007

In the summer of 2007, several students were engaged to evaluate current sustainability practices at HKUST. Areas evaluated included carbon footprint and sustainability effort in various administrative functions. A list of faculty members teaching or conducting research in environmental related subject areas was also compiled.

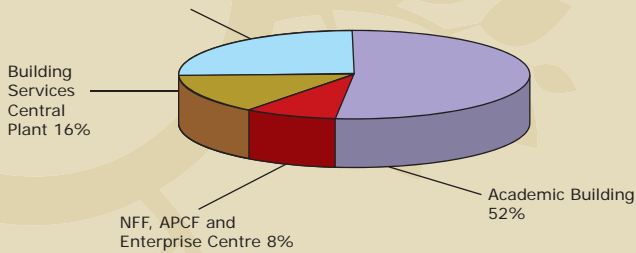
In defining HKUST's carbon footprint, effort was focused on assessing carbon emission from consumption of electricity and town gas on campus, and release due to transportation on and off campus, including international travel. Relevant data were obtained from FMO, Finance Office, Campus Services Office and Purchasing Office for assessment. Typically, consumption figures or distance traveled were converted to carbon dioxide emissions.

Between July 2006 and June 2007, HKUST consumed a total of 77 million kilo Watt hours of electricity which is equivalent to 41,000 metric tons of carbon dioxide emission. Consumption in the academic building (lighting, equipment, air handling and conditioning) accounted for 52%, while the student halls and staff quarters together with site B (Staff Quarters Towers 8-19, Graduate Residence Towers A-D, University Center) and sea front facilities (sports fields, swimming pools, Coastal and Marine Laboratory) accounted for

24%. The University's Building Services Central Plant (mainly to generate chilled water for air-conditioning and other cooling) accounted for 16%; Nanoelectronic Fabrication Facility (NFF), Animal and Plant Care Facility (APCF) together with the Enterprise Center accounted for the remaining 8%.

Electricity Consumption from July 2006 to June 2007

Student Halls, Staff Quarters together with Site B. Sea Front Facilities 24%

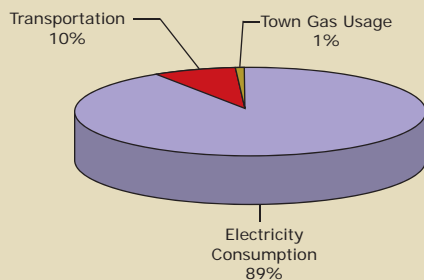


For the same period, HKUST consumed 26,500 giga Joules of town gas which was equivalent to 405 metric tons of carbon dioxide emission. Catering outlets, staff quarters, student halls and common areas accounted for 36%, 29%, 25% and 10% of the town gas consumption respectively.

The total carbon dioxide emission from HKUST transportation activities for the 12-month period was 4,400 metric tons. Staff driving private cars onto campus accounted for 46% while overseas business air travel accounted for 44%. The remaining 10% were contributed by staff and student bus services as well as official vehicles of the University.

In summary, 89% of the HKUST's carbon emission in the 12-month period of July 2006 to June 2007 came from electricity consumption, while transportation and town gas usage accounted for 10% and 1% respectively.

Carbon Emission from July 2006 to June 2007



A managerial audit was conducted to determine the extent to which environmental management and sustainability concepts and practices had been adopted within the Purchasing Office, Finance Office, Human Resources Office, Health, Safety and Environment Office (HSEO), FMO, and SAO administrative units and to determine the degree of integration of sustainability efforts within the University's organization and policies.

The University has the key elements of an environmental policy, steering committee, and environmental report. Furthermore, significant environmental governance has been imposed on investments and purchases, such as green building design, recycled paper and toner cartridge purchases, and substitution of hazardous with non-hazardous materials.

However, no target is established by the policy and most initiatives are pursued on an *ad hoc* basis. The integration of sustainability concept into policies and practices of the Purchasing, Finance and Human Resources Offices is limited as well. Most importantly the advances achieved have mostly been taken at the initiative of HSEO and FMO, and there has been little input from the students, faculty or the campus community. There is room for a great deal of innovation and systemization in the administrative functions of the University, and to tie student and faculty initiatives to it.

In terms of environmental education, as of September 2007, there were 66 environmental-oriented faculty members from different schools, departments and programs offering 93 different environmental courses at HKUST. In addition, there were 97 faculty members engaging in different environmental research areas.

8 Organic Farming

In March 2007, HSEO established the Organic Farming Club with full support from the Students' Environmental Interest Group, the Staff Association and FMO Horticulture Unit. The farm land with 180 square meter area is located at the lawn area outside LG7. Starting from April, over 100 staff and students participated in organic farming.



9 Vehicle Emission Test

EPD launched a free of charge program "Vehicle Emission Test" in Hong Kong. The test focused on pollutants generated by exhaust emission from motor vehicles, including hydrocarbon, carbon monoxide and nitrogen oxide. During the period from 21 to 29 August, a test station was set up at LG6 level of the open car park with the support from HSEO, the Staff Association and the Security Control Centre. The data and findings of this project would help EPD establish an advanced air quality control program. Over 50 vehicles (with petrol engine) were tested at HKUST. After the test, each participant received an "Emission Test Report" with vehicle exhaust emission test result and fuel consumption (HK\$/km) estimate. Participants also received a gift coupon from a company sponsoring this initiative to thank them for their support to the program.



10 Promotion of Safety, Health and Environmental Awareness

10.1 A Safety, Health and Environmental Exhibition and General Interest Lectures 2007 were organised by HSEO from 11 to 13 April 2007. The Exhibition and the General Interest Lectures covered a variety of topics on safety, health and environmental issues with a number of participating organizations, such as the Airport Authority Hong Kong, the Department of Health, EPD, Food and Environmental Hygiene Department, Hong Kong Fire Services Department, Occupational Safety and Health Council and Tseung Kwan O - Healthy and Safe City Project Office. Speakers included:

- Prof Lam Kin Chee of the Advisory Council on the Environment, topic: The Challenges of Managing Hong Kong's Environment.
- Prof Kwan Hoi Shan of the Expert Committee on Food Safety, topic: Ensuring the Safety of Hong Kong Food Supply.
- Mr Pang Kok Lam of the Labour Department, topic: The Role of a University in Helping to Shape Hong Kong's Occupational Health and Safety.
- Prof Sian Griffiths of The Chinese University of Hong Kong, topic: Establishing a Network of Healthy Universities in Asia-Pacific.
- Prof Gerald Patchell of HKUST, topic: A Vision for a Sustainable Campus.
- Dr Joseph Kwan of HKUST, topic: An Insider's Perspective on a Major Legionnaire's Disease Outbreak.
- Mr Mike Hudson of HKUST, topic: Future Development of the HKUST Campus - An Environmental Perspective.
- Dr Samuel Yu of HKUST, topic: HKUST's Unique, Behind the Scene, Effort in Ensuring a Healthy and Safe Campus Environment.



10.2 A "Dive off-Clean Up-Chip in" Campaign was jointly organised by FMO, Office of University Development and Public Affairs and the School of Science - Coastal Marine Laboratory on 3 June 2007 to clean the rubbish accumulated on the seabed off the coastline of our campus.

- 10.3 Better Air Quality Exhibition was organised jointly by the Council for Sustainable Development, SAO and the Students' Environmental Interest Group at the Chia-Wei Woo Academic Concourse in October. Pamphlets for the "Clean Air-Clear Choices" public engagement process were distributed and responses to the Better Air Quality Program were collected.
- 10.4 An exhibition with movie show was organized by the Students' Environmental Interest Group to promote environmental awareness and the Group's environmental conservation activities in October.

11 Environmental Research Projects

- 11.1 A number of environmental research projects were conducted. The scope of these projects covered a great variety of environmental issues, including oxygen consumption and nutrient regeneration, separation and recovery of dissolved precious metals, use of waste tyre for pyrolysis, aerosol particles emitted from crop residue burning, atmospheric air quality, indoor air quality, marine environment, waste water study, environmentally friendly bioengineered slopes, green products and processing technologies, sustainable supply of renewable energy, sustainable sewage treatment, etc.
- 11.2 Units engaging in environmental studies include:
- Department of Biology
 - Department of Chemistry
 - Department of Chemical Engineering
 - Department of Civil Engineering
 - Department of Mathematics
 - Department of Mechanical Engineering
 - HKUST Fok Ying Tung Graduate School
 - Institute for the Environment
- 11.3 A comprehensive list of environmental research projects conducted in 2007 is accessible at : <http://www.ab.ust.hk/sepo/EnvRep/env07.pdf>

12 Water Quality Control

- 12.1 Contractor continued to collect waste oil from various catering outlets for recycling. In 2007, 8,970 kg of used oil was collected.
- 12.2 Collection of water samples from potable water outlets, University's swimming pools and Dental Clinics continued for monitoring and maintaining proper standard.

13 Environmental Compliance

All environmental regulatory requirements applicable to University's operations are complied with. These include monitoring of waste water and sea water discharges, hazardous waste management, air emission and environmental noise, etc.