

Sustainability Report 2011



香港中文大學
The Chinese University of Hong Kong

MESSAGE FROM THE VICE-CHANCELLOR



Prof Joseph J Y Sung
Vice-Chancellor and President
The Chinese University of Hong Kong

Human progress in terms of scientific and technological advances has been going on, in recent decades, at a pace which even scientists from the 19th and early 20th Centuries could not have anticipated. With such advances has come an exploitation of the earth's resources on an unparalleled scale, and the adverse effect of the massive erosion of our natural environment has been readily felt all over the globe. As responsible citizens of the world we bear the burden of ensuring that our growth and development proceed in a sustainable manner; as educationists we are entrusted with the demanding task of inculcating the ecological message in our community, and especially in our young people.

I am very glad that, at The Chinese University of Hong Kong, we have been playing our part with considerable success, as the pages of this report will show. Since the days when the green idea first took root on our campus, we have targeted our efforts towards three objectives, namely, to develop multi-disciplinary research on conservation and sustainability, to devise policies and measures that put the latest knowhow and technology in the field into practice on campus, and to educate the community at large, through both academic and public means, in the importance of striking a reasonable balance between the convenience of modern-day life and the pursuit of infrastructural constructions on the one hand, and the environmental issues that are thus raised on the other. To these ends, the University established the Institute of Environment, Energy and Sustainability in April 2011. Not just another centre devoted solely to academic studies, the Institute, research aside, aims to be a facilitator of public education and knowledge transfer in matters pertaining to sustainability in Hong Kong, mainland China and the neighbouring region.

While we have taken it upon ourselves to preach the gospel of the green, and to bring about its realization on earth as best we can, we must also set our own house in order, and make CUHK campus an exemplar of conservation and sustainable growth for others to follow and learn from. The Campus Planning and Sustainability Office was established in July 2011 to coordinate efforts and resources, collect and analyze data, devise policies and translate them into practical measures for implementation on a campus-wide basis.

The year 2011 also played an important part in our green campaign on and off campus. It witnessed the final stage of our carefully planned and meticulously executed efforts to re-introduce the four-year curriculum into our undergraduate programme. In order to accommodate the double cohort of students due to be admitted in 2012, construction and alteration works on a massive scale took place at various locations on the campus. These were complemented by the augmentation and upgrading of facilities and services to ensure that teachers and students, despite their considerable increase in numbers, could continue to enjoy their campus life in a warm and caring environment, which would be conducive to knowledge transfer. This enormous campus modification programme, which took a good number of years to complete, has been executed in compliance with the latest concepts in sustainability, and demonstrated a very high degree of ecological awareness. Meticulous care was taken and priority consideration was given to environmental concerns, from the drafting of the master plan to the furnishing of individual buildings.

Apart from emphasizing the proper and economic use of materials and energies, the University also spared no effort in promoting environmental protection concepts and practices in campus life during 2011. The launch of the Cross-Strait Green University Consortium, the I-CARE Programme, and numerous community outreach initiatives, which are all detailed in the ensuing chapters of this volume, will give our readers a full picture of what the University contributed to the green cause through actions and activities in the past year.

I take the opportunity here to thank all members of the University community who strived to support the sustainable development of a green and caring campus during the year 2011 and am indeed very pleased to present this report to our teachers, students and alumni, as well as members of the general public, to celebrate our achievements, to witness our perseverance and our determination to do more and better in the years to come.

PREFACE



Prof LM Chu

Chairman of Committee on
Campus Environment

Sustainable development is no buzzword when our society is committed to it. Besides government and corporate efforts, tertiary institutions are one of the core strengths as they can lead by example and share experience in sustainability. We in CUHK are no exception. CUHK has a long-standing commitment to environmental improvement and sustainable development on campus as well as local and regional endeavours to incorporate sustainability into higher education. We have some successes, despite the various challenges we faced in energy consumption, waste management, in-house transport as well as campus ecology and conservation as these have been aggravated by the size and topography of our campus. In recent years, we have been charged with the preparatory work for the introduction of the 3-3-4 curriculum system. It was met by the establishment of new colleges, the construction of new buildings and the renovation of existing premises, all of which have culminated in scale in 2011-12. To minimize the ecological footprint of the various projects, we have actively pursued energy and water efficiency, green building design, the introduction of a green purchasing scheme and a green office programme. In 2011, we added to our existing 'green team' the Campus Planning and Sustainability Office, which was set up as a policy unit to spearhead the advancement in campus development and environmental management. We have joined the Cross-Strait Green University Consortium to step up our environmental commitment and share our experience in campus sustainable development. Despite our physical constraints, we have made progress in the building of a pedestrian-friendly campus and the purchasing of greener motor vehicles. Yet sustainability cannot be achieved solely by the policies developed. We need the collaborative efforts of all the stakeholders of the University just as much as our work with external sectors and possibly other institutions on campus sustainable development. We have moved up a gear to include corporate social responsibility for sustainability benchmarking. This is essential if we are heading towards the direction of full sustainability reporting in the coming future. With our senior management - our Vice-Chancellor, Provost, Pro-Vice-Chancellors, Associate Pro-Vice-Chancellors and Directors of CPSO, EMO and CDO - taking the lead, and active bottom-up participation from our University community, we should be able to continue to improve in all aspects of environmental protection and achieve excellence in campus sustainability.

SUSTAINABILITY REPORT 2011

The Chinese University of Hong Kong (CUHK) is the first UGC-funded institution to have made a comprehensive environmental review and audit of the campus and produced a report thereon. Since 2000, CUHK has issued reports on its environmental performance annually and has continuously enhanced their coverage. In 2006, sustainability indicators were established, enabling the University to quantify and compare its performance over the years. Besides providing quantitative data, this report reflects our green commitments and interests, such as awareness enhancement and community outreach.

This report focuses on CUHK's efforts and progress towards environmental sustainability. Significant impacts arising from our daily activities and our environmental performance are covered with reference to the Global Reporting Initiative (GRI) G3.1 Guidelines. Statistical data are collected and normalized for benchmarking across years. Data from staff quarters, student hostels, canteens as well as offices and activities outside campus have been excluded from the report's statistical analysis as activities and resources consumption outside campus or in the aforesaid premises do not fall directly under the management of the University.

To protect the environment and reduce the carbon footprint resulting from paper consumption and postal distribution, this report is published online only. For more detailed information on the University's environmental achievements and the practices we currently employ to this end, please refer to our sustainability website (<http://www.cuhk.edu.hk/english/campus/environmental-protection.html>).

TABLE OF CONTENTS

■ ABOUT CUHK	6
■ OUR VISION AND COMMITMENTS	7
■ OUR GREEN TEAM	8
■ OUR ENVIRONMENT	9
- Energy Conservation	9
- Green Transportation	11
- Pedestrian-Friendly Campus	11
- Greener Modes of Transportation	11
- Greenhouse Gas (GHG) Emissions	13
- Waste Reduction	14
- Towards Paperless Operations	14
- Municipal Solid Waste	16
- Other Wastes	18
- Water Conservation	21
- Air Quality	22
- Green Purchasing	23
- Green Buildings	24
- Landscape and Ecology	25
- Compliance and Monitoring	27
■ OUR TEACHING AND RESEARCH	28
- Green Education Programmes	28
- Research Contributions	32
- Raising Awareness	34
■ OUR OUTREACH TO COMMUNITY	36
- I·CARE Programme	36
- Cultivating Talent and Innovation	36
■ OUR AWARDS	37
■ THE WAY FORWARD	38
■ APPENDICES	39

Abbreviations

BEAM	Building Environmental Assessment Method	ESA	Environmental Sustainability Ambassador
BO	Business Office	FTE	Full-time equivalent
CAI	Computer Account Information	GE	General Education
CCE	Committee on Campus Environment	GHG	Greenhouse gas
CCS	Committee on Campus Sustainability	GRI	Global Reporting Initiative
CDO	Campus Development Office	GRM	Department of Geography and Resource Management
CEPRM	Centre for Environmental Policy and Resource Management	HKSAR	The Hong Kong Special Administration Region
CLEC	Campus Landscaping Enhancement Committee	IAQ	Indoor air quality
CMP	Campus Master Plan	IEES	Institute of Environment, Energy and Sustainability
CO ₂	Carbon dioxide	ITSC	Information Technology Services Centre
CPC	Campus Planning Committee	LED	Light-Emitting Diode
CPSO	Campus Planning and Sustainability Office	NGO	Non-Governmental Organization
CSEAC	Centre of Strategic Environmental Assessment for China	PRC	The People's Republic of China
CUHK	The Chinese University of Hong Kong	SCACS	Student Computing Accounts Collection System
C&D Waste	Construction and Demolition Waste	SOX	Low pressure sodium
EIA	Environmental Impact Assessment	UGC	University Grants Committee
EMO	Estates Management Office	USO	University Safety Office
EPD	Environmental Protection Department	YES	Yard for Environmental Sustainability

ABOUT CUHK

Founded in 1963, The Chinese University of Hong Kong (CUHK) is one of the top universities in Hong Kong and Asia and is known for its commitment to excellence in teaching and research, as well as its mission to bring together China and the West. Overlooking Tolo Harbour, the campus occupies an area of 137 hectares, with over 150 buildings, and provides a wide range of facilities, such as libraries, art museums, music halls, a swimming pool, sports fields, tennis courts, water sports centre and gymnasiums. Over 60% of the campus is covered with greenery, making the University the largest and greenest campus among the tertiary institutions in Hong Kong. To address the emerging needs of curriculum reform as well as the establishment of five new colleges, numerous large capital projects got underway on campus in 2011 for the extra 3,000 undergraduates to be admitted in 2012 under the four-year curriculum.

At present, the University has nine colleges and eight faculties, viz., Arts, Business Administration, Education, Engineering, Law, Medicine, Science and Social Science. There are about 7,000 academic and non-academic staff members, and the total postgraduate and undergraduate enrollment stands at over 25,000. In 2011, 8,149 first degrees and higher degrees were awarded, and the cumulative number of alumni was 144,300.

Figure 1: New building projects on campus

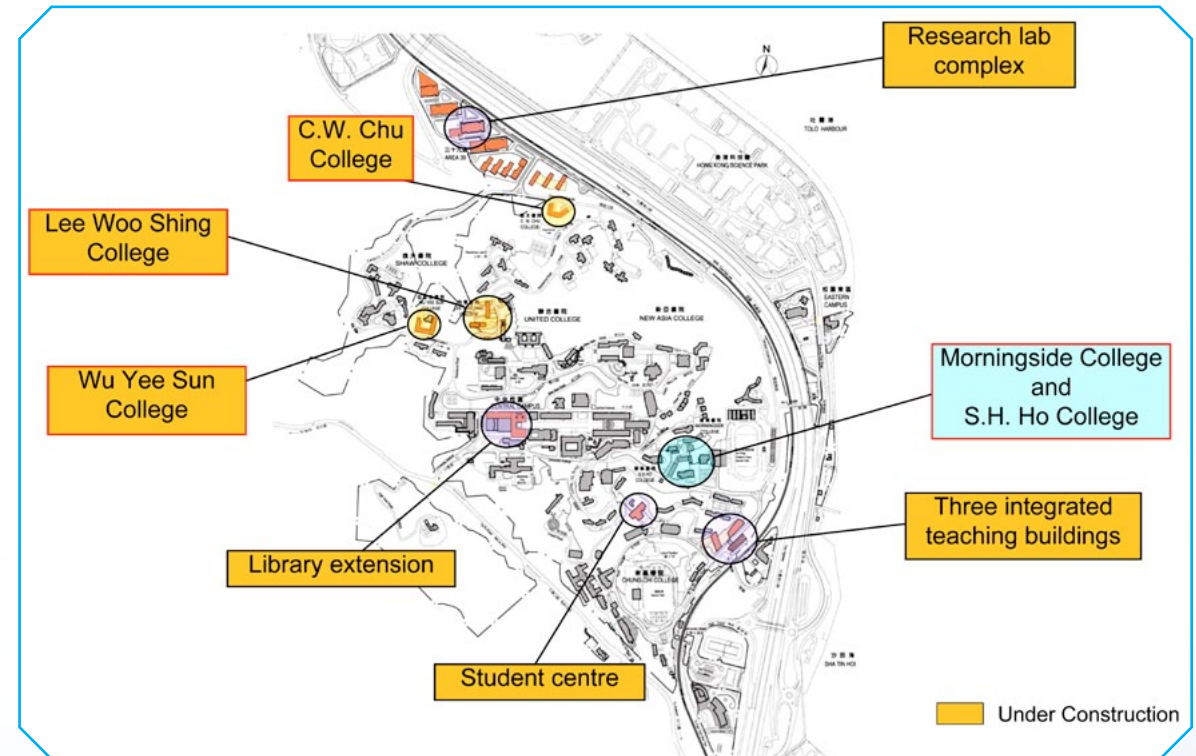


Table 1. Total number of full-time equivalent (FTE) students and total number of full-time staff in CUHK as at 31 December 2011

	Number	Percentage of Campus Population
Total number of FTE students (including UGC-funded and self-financed)	20,947.6	75%
Total number of full-time staff	7,019	25%
Total number of FTE students & number of full-time staff	27,966.6	100%

* As the students of School of Continuing and Professional Studies attended classes outside the main campus, they were excluded from the above data set.

OUR VISION AND COMMITMENTS

As a leading university in both the regional and global context, CUHK aspires to be an exemplar in promoting sustainable development in Hong Kong, China and our region. To realize this vision, the University endeavours to build a sustainable campus for our staff and students and even more importantly, achieve academic excellence in environment, energy and sustainability as well as actively engage in knowledge transfer in raising awareness, guiding and leading the community in adopting sustainability initiatives for reducing carbon emission and ecological footprint.

CUHK has therefore mapped out a sustainable and visionary blueprint for the development of the University campus in the years up to 2021 and beyond in its Campus Master Plan (CMP) which was published in 2010. As laid down in the CMP, the University has set ambitious goals to reduce energy use (per capita) and greenhouse gas (GHG) emissions (per capita) on campus by 25% and 20% respectively by 2025.

To achieve these goals, the University has established a governance structure with strong support and commitment from the senior management, and a policy landscape to foster the development of a sustainable campus and facilitate good environmental management. Various environmental and sustainability policies have been formulated in recent years so as to integrate sustainability principles into the University's daily operations. These include the Environmental Policy, Energy Policy, Tree Preservation Policy and the new Green Purchasing Policy (adopted in 2011).

Our core strategies include uptaking of green technologies in energy efficiency, water conservation and waste reduction, the use of cleaner energy, adoption of green building standards, preservation of ecologically and culturally significant areas, green purchasing, and optimizing the performance of a low-carbon transport system.

To transfer the knowledge of sustainability to the public, especially our future generations, CUHK works closely with industries, governments and NGOs as well as different community stakeholders to build a sustainable environment for our future generations. CUHK is also a signatory of the following:

Carbon Reduction Charter (2008)

As a signatory of the Carbon Reduction Charter of the Environmental Protection Department (EPD), CUHK is committed to encouraging and supporting the building management to conduct carbon audit on buildings and improve their GHG emission performance in accordance with the recommendations arising from the audit, as well as other carbon-reduction strategies in the Charter.

Hong Kong Declaration (2010)

Along with seven other publicly-funded universities in Hong Kong, CUHK pledged its commitment to respond to the challenges posed by climate change and sustainable development and will do so by setting targets for the reduction of energy consumption, GHG emissions, water use and waste disposal. CUHK also pledged to meet these targets by increasing its operational efficiency, to raise awareness about sustainability issues across all faculties and major fields of study, and to report regularly on progress with regard to key operational targets. The Hong Kong Sustainable Campus Consortium, a platform that fosters exchange of best practices, collaborations and reporting of progress, was established jointly by the eight signatories in 2010 to work together towards a common goal.

With the above vision and commitments, we hope to help build a sustainable future for our future generations.

OUR GREEN TEAM

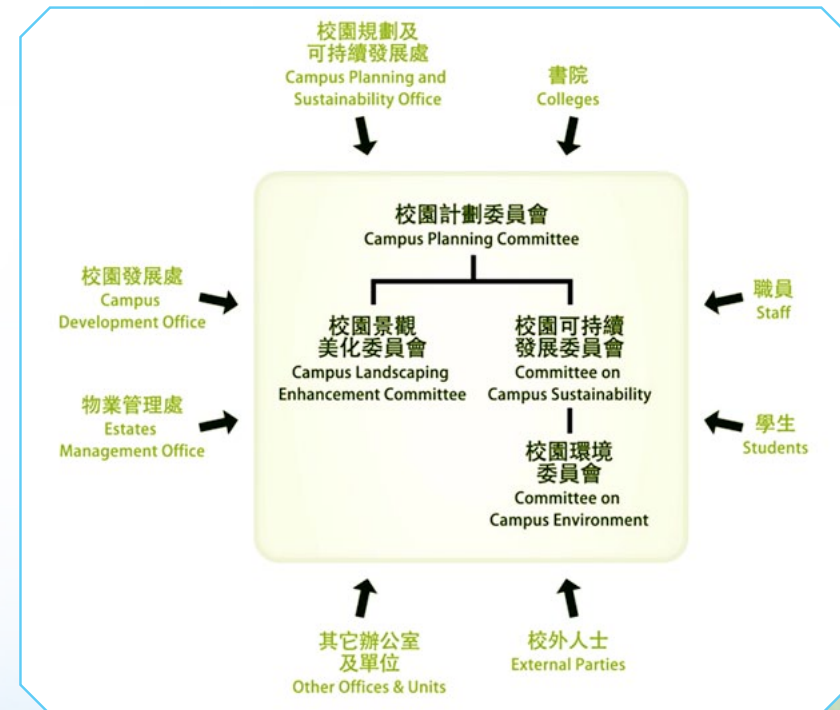
The University has established several committees that play decision-making or advisory roles in sustainability issues. Staff, students and college representatives are appointed as members to serve on these committees and act as communication channels between these committees and the university community. Sustainability initiatives are then implemented with the assistance of administrative offices.

The Campus Planning Committee (CPC), chaired by the Vice-Chancellor, oversees the development of the campus. It has two subcommittees - the Committee on Campus Sustainability (CCS), which oversees the sustainability policies and their implementation and formulates action plans for the Campus Master Plan (CMP) for the long-term development of the campus; and the Campus Landscaping Enhancement Committee (CLEC), which focuses on campus landscaping and greening issues. Under CCS, there is the Committee on Campus Environment (CCE) which is tasked with duties/functions in relation to environmental matters such as promoting awareness among staff and students in environmental protection and campus ecology, and reporting on environmental performance.

On 1 July 2011, the Campus Planning and Sustainability Office (CPSO) was set up as a policy unit to support the long-term planning and physical development of the University and help balance the University's growth needs, environmental concerns and sustainability commitments. CPSO also takes charge of space planning and allocation matters as an integral part of the campus planning function. To maximize synergy, the University Safety and Environment Office will transfer its environment-related duties to CPSO starting from 1 January 2012 and be renamed as the University Safety Office (USO). In setting the framework for policy making and priority setting, CPSO works closely with the senior management, the colleges and the related frontline administration offices, in

particular, the Campus Development Office (CDO), the Estates Management Office (EMO) (which consists of an Environmental Sustainability Team providing significant support in the frontline implementation of green initiatives), USO, Business Office, the Information Technology Services Centre (ITSC) and the Transport Unit.

Figure 2: Governance structure on sustainability management



OUR ENVIRONMENT

Being a tertiary institution with about 28,000 staff and students, the University is well aware that its daily operations have significant impact on the environment. By adopting best practices, the University strives to be a role model and do its part in developing a culture of sustainability in Hong Kong. In 2006, the University developed a set of comprehensive sustainability indicators to quantify its progress towards sustainability. This section does not only give a qualitative report on the University's initiatives in 2011, but also provides data on resources consumed, waste generated, carbon footprint and other key indicators with which the University's environmental performance can be measured.

Energy Conservation

In the past decade, the University has endeavoured to conserve energy on campus by upgrading facilities and adopting new technologies such as lighting retrofit, water-cooled chiller plants and solar shield window films. In 2010, the low pressure sodium (SOX) street lamps were replaced with 100 sets of light-emitting diode (LED) lamp and 300 electrodeless induction lamp sets. The low-efficiency tungsten halogen lamps in selected offices and lecture theatres were replaced with 1,000 LED lamp sets. Being a pioneer of the use of renewable energy, CUHK continues to champion the installation of renewable energy facilities including solar hot water systems, hydraulic ram pumps, wind turbines and solar street lighting around campus. As a result, about 750,000 kWh of electricity was saved by energy saving devices and 1,130,000 kWh of electricity was generated by renewable energy facilities every year.



LED (left) and electrodeless induction (right) lamps replace SOX street lamps



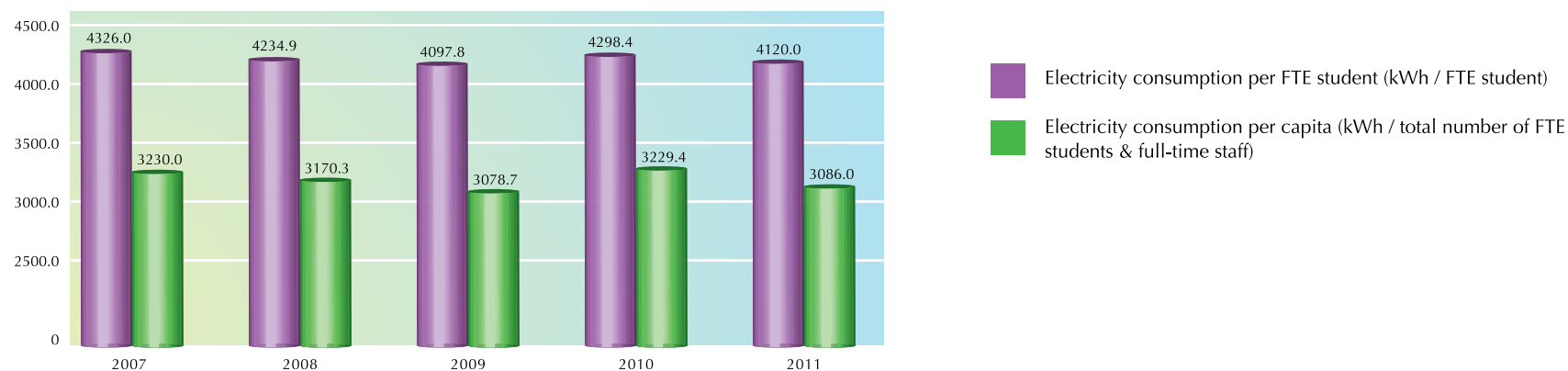
LED lamps replace tungsten halogen lamps in selected offices and lecture theatres

Compared with 2010, the number of FTE students in 2011 rose by 3.6%. It is encouraging that the University consumed 86,304 MWh electricity, with an increase of only 1.5%, and each FTE student consumed about 4,120 kWh of electricity, representing a decrease of 4.2% from last year's figure. It proves that our electricity-saving measures are effective. However, it is anticipated that the total energy consumption will show an upward trend in 2012 because of the completion of a number of new buildings and college premises in the double-cohort year when the total undergraduate student numbers will increase by one third. We will therefore step up our efforts in energy conversation and try our best to reduce the overall electricity consumption and also the consumption per capita.

Table 2. Energy consumption in terms of FTE student and per capita

Indicator	Definition	Results
Electricity consumption per FTE student	Total electricity consumption / Number of FTE students	4,120.0 kWh / FTE student
Electricity consumption per capita	Total electricity consumption / Number of FTE students & full-time staff	3,086.0 kWh / capita

Figure 3: Electricity consumption for the period 2007–2011



Green Transportation

As our campus is built on a hilly terrain, our staff and students rely heavily on shuttle buses for commuting. Our Transport Unit operates a fleet of buses and minibuses to provide transportation services within the campus and contractors are hired to provide extra services at peak hours. In addition, various departments operate trucks, vans, cars and scooters to meet their operational needs. All these vehicles are properly maintained in good condition by our own garage or contractors for maximum efficiency.



Walking Campaign

Pedestrian-Friendly Campus

One of the planning precepts of CUHK's CMP is the development of a pedestrian-friendly campus. Walking is not only an environmentally-friendly practice but is also a time-honored way to experience CUHK's beautiful campus. Thus, many buildings in CUHK have been designed with bridge links and vertical connections to enable fast and convenient pedestrian movement up and down the hill. Numerous trails and footpaths have also been developed over the years to enable people to get from one area to another quickly while enjoying CUHK's scenery. To promote a walking culture, the Committee of Health Promotion and Protection has been organizing regular walking campaigns in collaboration with various departments and units since 2007.



New model of electric scooters



Cycling track between MTR station and Area 39

Greener Modes of Transportation

Motor vehicles are the main source of our roadside air pollution and contribute to our GHG emissions on campus. To improve air quality and reduce our carbon footprint, the University continuously seeks greener transportation opportunities. CUHK was the first university in Hong Kong to introduce a fleet of emission-free electrical scooters in 2002. Our electrical scooter fleet was expanded from 5 to 10, and old scooters were replaced with more efficient models in 2011. We also plan to replace all official cars/vans/scooters with low emission vehicles when the vehicles reach the end of their life span. In fact, we started to replace school buses with new buses meeting Euro V Standard in 2011.

Though the campus is hilly in general, a flat site stretching from the University MTR Station to Area 39 where research facilities are located is suitable for cycling. The University began the construction of a cycling track from the MTR station to Area 39 in 2010 and continued to extend the track in 2011.

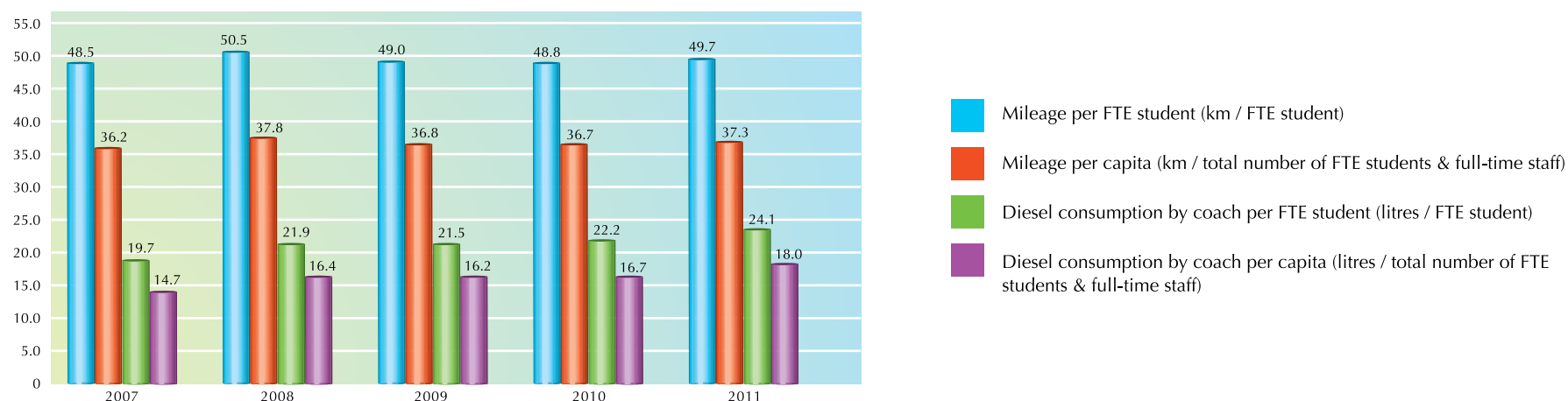
Compared with 2010, the total coach mileage and total diesel consumption increased by 6.6% and 13.3% respectively. In terms of per FTE student, the coach mileage increased by 1.8% to 49.7 km and the diesel consumption increased by 8.6% to 24.1 litres. Considerations will be given to conduct a study to identify the reason(s) for the increasing coach mileage per capita and consumption of diesel.

Table 3. Coach mileage and diesel consumption in terms of FTE student and per capita

Indicator	Definition	Results
Mileage per FTE student	Total mileage / Number of FTE students	49.7 km / FTE student
Mileage per capita	Total mileage / Number of FTE students & full-time staff	37.3 km / capita
Diesel consumption by coach per FTE student	Total diesel consumption / Number of FTE students	24.1L / FTE student
Diesel consumption by coach per capita	Total diesel consumption / Number of FTE students & full-time staff	18.0 L / capita

* 'Coach' includes buses, minibuses and vans operated by the University and the contractor(s) that provide transport services for staff and students on campus.

Figure 4: Diesel consumption and mileage for the period 2007–2011



Greenhouse Gas (GHG) Emissions

To combat climate change, the University first calculated its carbon emissions in 2006. The methodology was standardized in 2009 in accordance with the 'Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong' published by EPD*. Since 2008, campus-wide carbon audits have been conducted on an annual basis and used as basis for formulating short-term and long-term energy saving plans.

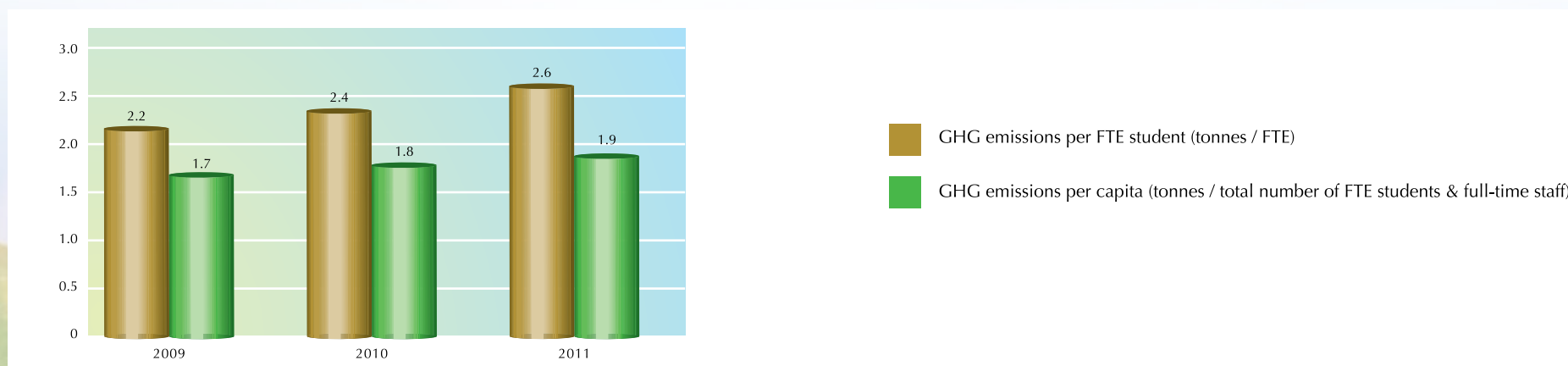
In August 2008, CUHK signed the HKSAR Government's Carbon Reduction Charter and made a commitment to carry out carbon auditing and reduce GHG emissions caused by the University's daily activities. An Environmental Sustainability Ambassador (ESA) Programme, sponsored by Hang Seng Bank, was launched in May 2009 to raise awareness about climate change and provide training on carbon auditing for staff and students. Every year, staff members who have participated in the programme shall help their respective offices gather data on their offices' carbon footprint. The data are then sent to EMO for the preparation of CUHK's carbon audit report.

The GHG emissions per FTE student in 2011 was 2.6 tonnes, rising about 8.3% compared with 2010, although a decrease of electricity consumption (which contributes the majority of CO₂ emission on campus) by 3.3% per FTE student was recorded. This could be explained by the upward adjustment of CO₂ emission factor from 0.54 to 0.59 by China Light and Power, the local power company. To achieve the long-term target in cutting the GHG emissions per capita by 20% in 2025 from the campus base figure of 2005, the University is escalating its efforts to minimize energy usage and carbon emissions.

Table 4. GHG emissions in terms of FTE student and per capita

Indicator	Definition	Results
GHG emissions per FTE student	Total GHG emissions / Number of FTE students	2.6 tonnes of CO ₂ equivalent / FTE student
GHG emissions per capita	Total GHG emissions / Number of FTE students & full-time staff	1.9 tonnes of CO ₂ equivalent / capita

Figure 5: GHG emissions during the period 2009–2011*



*CUHK has followed EPD's guidelines published in 2009 in reporting GHG emissions

Waste Reduction

Towards Paperless Operation

We pledge to reduce paper in our daily operation. Instead of letters, memo and fax, e-documents are widely used to communicate with our working partners. Hardcopies of reports, newsletters, publications, etc. are minimized as much as possible, and staff and students are encouraged to read the online/electronic versions.

In the past, students collected their Computer Account Information (CAI) slips either in person or by postal mail. The amount of papers used for printing the CAI slips was significant, not to mention the inconvenience caused. In 2010, the Student Computing Accounts Collection System (SCACS) was developed as a simple and convenient way for electronic collection of computer account information and was made available to all newly-admitted undergraduates and some postgraduates from several departments. In 2011, the coverage was



The SCACS enables convenient and environmentally-friendly collection method of computer account information



Library issues email instead of paper notice as reminder

extended to all postgraduates and it is estimated that over 10,000 pieces of paper are saved per year.

The Business Office (BO) and ITSC also worked together to design and implement a new Purchase Order Form for printing on A4-sized paper. Previously, purchase orders printed from the financial system by BO used 4-ply F4 paper. The conversion to A4 paper format has saved paper and reduced printing cost by up to 30%. Moreover, BO has developed an internal e-filing system to handle the tender documents which will save at least 30% of the paper compared to the amount of paper used in BO under the old process. In libraries, email instead of paper notice was used to remind our students of their circulation record. Apart from that, double-sided printing and photocopying are adopted as a standard practice.



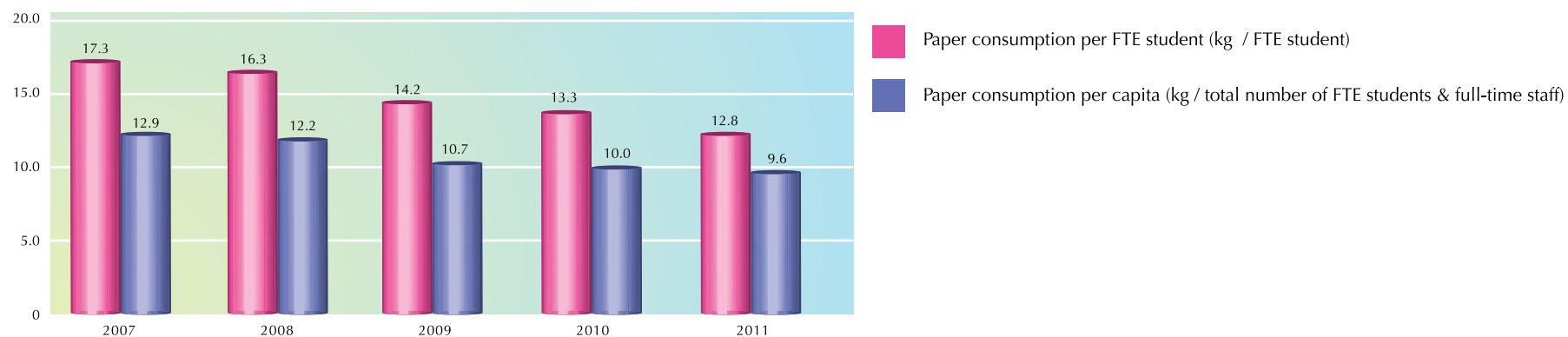
Conversion of purchase order forms from F4 size to A4 size

In 2011, the total amount of paper CUHK consumed was 267 tonnes. This averages to 12.8 kg of paper per FTE student. The total paper consumption has decreased steadily in the past five years. Compared with 2007, our annual paper consumption has decreased by 46.7 tonnes, which is equivalent to saving about 950 trees. Average paper consumption per FTE student has decreased significantly by 25%.

Table 5. Paper consumption in terms of FTE student and per capita

Indicator	Definition	Results
Paper consumption per FTE student	Total paper consumption / Number of FTE students	12.8 kg / FTE student
Paper consumption per capita	Total paper consumption / Number of FTE students & full-time staff	9.6 kg / capita

Figure 6: Paper consumption for the period 2007–2011



Municipal Solid Waste

CUHK has long recognized Hong Kong's pressing waste disposal problem and its own social responsibility, and has implemented a series of measures to reduce and recycle its wastes. To encourage students and staff to recycle, the University has started installing recycling bins since the 1990s. In 2011, there was a total of 152 strategic points on campus for collecting recyclable and reusable materials like paper, plastics, aluminium cans, printer cartridges, rechargeable batteries, banners, old clothes and glasses. BO collects obsolete computers and electrical appliances from CUHK offices and donates them through charity organizations to people in need. Collection programmes are also organized at hostels from time to time to collect used clothing, books, toys, etc. for charity. Some colleges arranged recycling programmes for students at the end of the academic year to donate unwanted but usable items to charities. Furthermore, student bodies and various groups organized flea markets and old book sales from time to time to sell usable second-hand items. CUHK also supported the recycling initiatives of two social enterprises, Green Collar and Déjà vu Creation. In 2011, United College cooperated with Green Collar in a pilot project to compost the food waste of United College's canteen for growing vegetables. EMO regularly collects and provides used banners to the social enterprise Déjà vu Creation, which uses these banners to make bags and accessories. EMO also invited Déjà vu Creation to speak at its annual launch ceremony of the ESA Programme and held a workshop on making roses with used banners.

Corsages made with used banners
by Déjà vu Creation



Ms. Tang Wai Ling of Déjà vu
Creation demonstrated to ESA
participants on banner reuse

In 2011, a 'Yard for Environmental Sustainability (YES)' was set up in central campus to collect reusable and recyclable materials (glass bottles, used banners, electrical appliances, toys, souvenirs, books, clothes) for reuse, recycling and up-cycling. YES consists of seven huts designed by EMO and built with dead wood



YES with 7 huts, each made of dead wood and waste materials, to collect various types of recyclable items

and waste materials. Interested staff and students can visit the huts to drop off or pick up items that can still be reused. Items collected will also be given to NGOs or recycling companies for reuse or recycling. Materials will be recycled only when reuse is not ideal or feasible.



Waste glass bottles were used for production of eco-bricks

合辦：香港中文大學逸夫書院學生宿舍管理委員會與非牟利「社區二手店」 查詢電話Enquiry：27297023
Co-hosted：Shaw College Student Hostel Management Committee, CUHK & Non-profit making Community Recycling Coop

二手物回收 Usable Items Collection

回收物品(功能正常及七成新淨) COLLECTING ITEMS (WELL-FUNCTION & 70% NEW)

- | | |
|-----------------------------|---|
| (1) 衣服、鞋、袋、書包 | (1) Clothing, shoes & bags |
| (2) 煮食用具、餐具、枕頭、被舖 | (2) Cooking Utensils, tableware, pillows & bedsheet |
| (3) 文具、擺設 | (3) Stationery & decoration |
| (4) 書籍(教科書除外)、VCD、DVD、CD | (4) Books(except textbooks), VCD, DVD & CD |
| (5) 小型電器(不收掃瞄器、噴墨打印機、CRT螢幕) | (5) Small electrical appliances
(except scanner, ink-jet printer, CRT Monitor) |

收集箱設於國楸樓、第二學生宿舍高座大堂
Collection boxes at lobbies of Kuo Mou Hall, Student Hostel II, High Block
18/05/2011(Wed) - 29/05/2011(Sun)

小型電器或體積大於14吋電視機的物品請在5月18日(三)中午12時-3時交到新亞書院樂群館梁雄樞樓大堂的回收櫃位

Small electrical appliances or items bigger than a 14"TV set, please hand to the Collection Counter at 12:00 noon - 6:00pm on 18/5 (Wed) at Student-Staff Centre Leung Hung Kee Bldg, Asia College

你捐來的物品往哪裡去?
Where do your donated items go to?

在政府註冊非牟利慈善機構勞協轄下
深水埗社區二手店 平價售賣
Your donated items will be sold at low prices
in Community Recycling Coop in Shamshui
hosted by charitable organisation Industrial Relations Institute

你的行動可以 Your Action can
減輕低收入家庭負擔 help low-income families
協助基層就業 provide job for workers
促進資源再用 save the environment



電話：2729 7023 政府註冊非牟利慈善機構勞協轄下社會企業
Social Enterprise based by government approved non-profit making charitable organization INDUSTRIAL RELATIONS INSTITUTE
<http://www.iri.org.hk>

Recycling programme during
hostel retreat of Shaw College

In 2011, the total amount of municipal solid waste disposed of at the landfill was 841 tonnes. Compared with the previous year, the amount of municipal solid waste generated by each FTE student in 2011 showed a decrease of 20%. From 2007 to 2011, the volume of solid waste generated per capita has been decreased by 54.4%, and recycling rate has increased from 18% to 23.8%, a testimony to the effectiveness of the initiatives CUHK has undertaken to reduce waste.

Table 6. Wastes collected during the period 2007–2011

Items	2007	2008	2009	2010	2011
Waste paper (kg)	326,131	259,418	271,450	345,106	246,281
Plastics (kg)	1,140	4,869	6,655	11,510	8,826
Aluminium cans (kg)	709	593	501	1,348	777
Metals (other than aluminium) (kg)	-	544	1,840	5,310	1,720
Printer cartridges (unit)	568	743	878	655	967
Used clothing (kg)	4,165	4,629	3,576	3,390	3,367
Compost (kg)	104	160	240	420	340
Recycling rate (%)	18.0%	11.0%	17.7%	26.9%	23.8%

Other Wastes

The handling of hazardous waste is strictly controlled on campus. Chemical waste and clinical waste, mainly the by-products generated from our researches, are collected by licensed collectors for disposal. Our large variety of waste types poses great difficulty in the handling of our hazardous waste. Our staff members are trained to separate and store the waste properly before collection. Since the outbreak of the Fukushima Daiichi nuclear disaster in Japan in March 2011, people have been much more concerned about radiation safety. The University has a professional radiation safety officer to look after storage, decay and disposal of radioactive waste produced in our laboratories, following the disposal limits in the radiation licenses issued by the Hong Kong Radiation Board. In 2011, 45.3 tonnes of chemical waste, 26.4 tonnes of clinical waste and 80 kg of radioactive waste were produced on campus. On average, 2.0 kg of chemical waste, 1.2 kg of clinical waste and 3.8 g of radioactive waste were generated per FTE student.



Used or contaminated sharps are collected as clinical waste for disposal

Chemical waste storage area



September 2012 will mark a new page for CUHK as the undergraduate curriculum will make the transition from a three-year to a four-year degree structure. To provide the best learning environment for the new cohort of students, we have to expand our infrastructure, facilities and services. In 2011, there were 10 capital projects and 6 AA&I (Alterations, Additions, Repairs and Improvements) projects on campus, involving new teaching blocks, student hostels, library extension, amenities centre, canteen services, drainage system and infrastructure upgrading. To minimize the construction and demolition (C&D) waste, materials were sold or reused, and inert waste was used by other construction sites or disposed of at public fills for land reclamation. Only the non-inert C&D waste was disposed of at landfills as the last resort. Last year, 10,230 tonnes of C&D waste (non-inert) were disposed. That means 488.4 kg of C&D waste was generated per FTE student. In comparison with that in 2010, the C&D waste increased by about 55%, setting a new record. However, it is expected that the volume of C&D waste will drop in the coming years after the apex of campus development in 2011 and 2012.

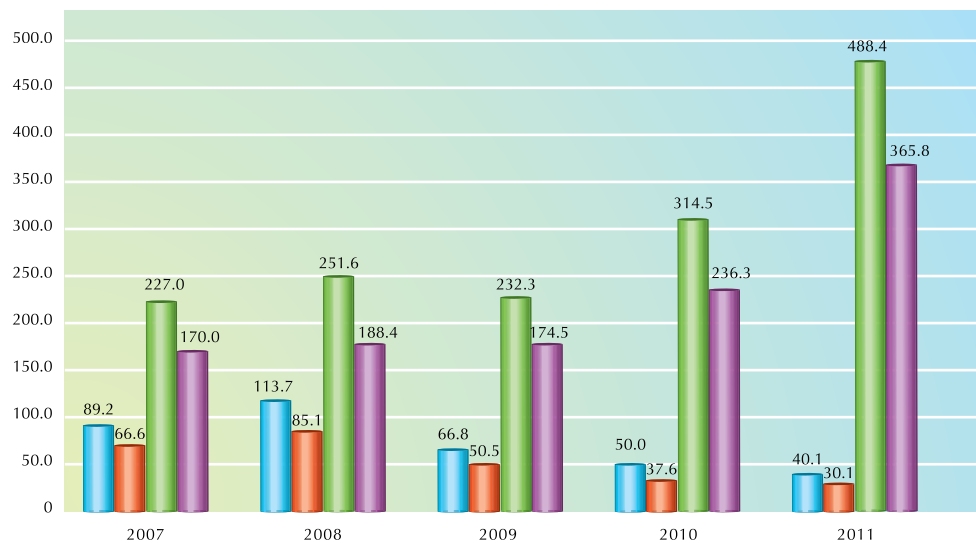


Metal wastes are sorted on site and sold to collector for recycling

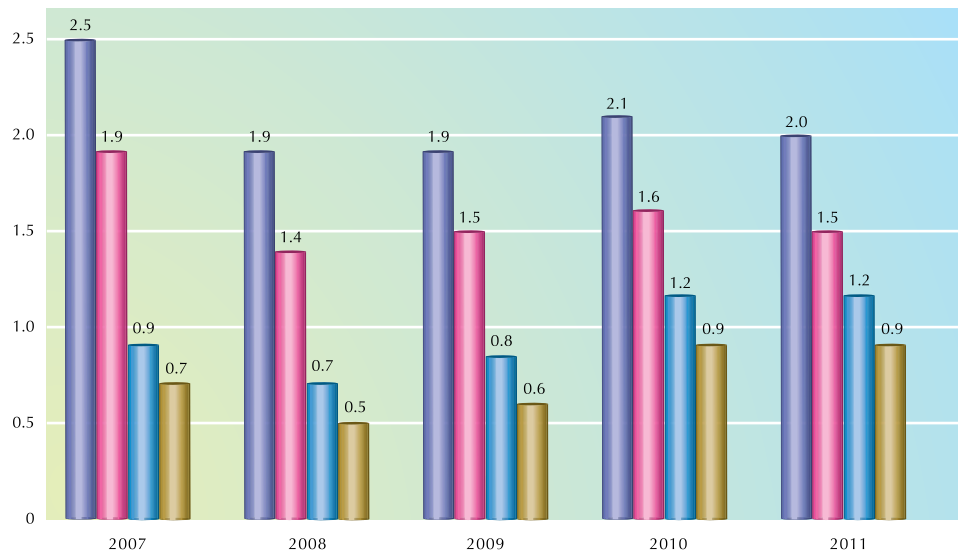
Table 7. Volume of various wastes in terms of FTE student and per capita

Indicator	Definition	Results
Municipal solid waste per FTE student	Total municipal solid waste / Number of FTE students	40.1 kg / FTE student
Municipal solid waste per capita	Total municipal solid waste / Number of FTE students & full-time staff	30.1 kg / capita
Chemical waste per FTE student	Total chemical waste / Number of FTE students	2.0 kg / FTE student
Chemical waste per capita	Total chemical waste / Number of FTE students & full-time staff	1.5 kg / capita
Clinical waste per FTE student	Total clinical waste / Number of FTE students	1.2 kg / FTE student
Clinical waste per capita	Total clinical waste/Number of FTE students & full-time staff	0.9 kg/capita
Radioactive waste per FTE student	Total radioactive waste/Number of FTE students	3.8 g / FTE student
Radioactive waste per capita	Total radioactive waste / Number of FTE students & full-time staff	2.9 g/capita
Construction and demolition waste per FTE student	Total construction and demolition waste / Number of FTE students	488.4 kg / FTE student
Construction and demolition waste per capita	Total construction and demolition waste / Number of FTE students & full-time staff	365.8 kg / capita

Figures 7a & 7b: Waste generation during the period 2007–2011



- Municipal solid waste per FTE student (kg / FTE student)
- Municipal solid waste per capita (kg / total number of FTE students & full-time staff)
- Construction and demolition waste per FTE student (kg / FTE student)
- Construction and demolition waste per capita (kg / total number of FTE students & full-time staff)



- Chemical waste per FTE student (kg / FTE student)
- Chemical waste per capita (kg / total number of FTE students & full-time staff)
- Clinical waste per FTE student (kg / FTE student)
- Clinical waste per capita (kg / total number of FTE students & full-time staff)

Water Conservation

Water conservation is of particular concern to CUHK, as much water is needed to irrigate its expansive grounds and meet the needs of its growing student population. The University has made great efforts to minimize water consumption by installing water saving devices and reduce water wastage by regular checking and maintenance. In 2011, the University consumed 916,880 m³ potable water - 43.8 m³ per FTE student. The water consumption per FTE student was steady in the past few years.

Whenever possible, we minimize potable water consumption by reusing water wisely and utilizing natural water resources available. Every year, at the end of the swimming season, water left in the swimming pool is allowed to sit until the disinfectant in the water has undergone natural degradation. The water is then used for irrigation. For construction projects, contractors are also encouraged to recycle water during construction.

Construction of a water treatment plant near the Fong Shu Chuen Building commenced in 2011. When it is completed, sediment-rich lake water from Weiyuan Lake will be pumped into the facility and filtered to levels fit for use. The plant can produce over 1,000 m³ of high-quality treated water per day for chiller plants for air conditioning and irrigation, further reducing the amount of potable water the University requires. Seawater is replacing lake water/fresh water as flushing water on campus.



Weiyuan Lake

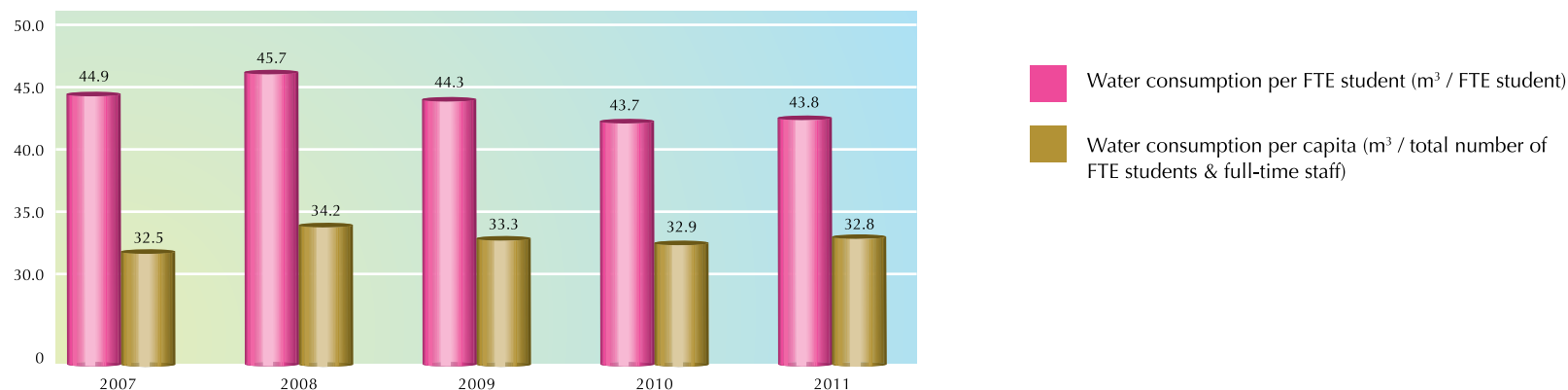


Construction of water treatment plant

Table 8. Water consumption in terms of FTE student and per capita

Indicator	Definition	Results
Water consumption per FTE student	Total water consumption / Number of FTE students	43.8 m ³ / FTE student
Water consumption per capita	Total water consumption / Number of FTE students & full-time staff	32.8 m ³ / capita

Figure 8: Water consumption during the period 2007–2011



Air Quality

To help improve the air quality on campus, the University has made great effort to reduce the roadside pollutants such as RSP, SO₂ and nitrogen oxides (NO_x) by promoting cleaner transportation. CUHK has introduced vehicles that meet a higher Euro emission standard since early 2000. In 2011, CUHK introduced its first school bus which meets the latest and toughest emission standards – Euro V, contributing to a cleaner environment.

In October 2011, CUHK was awarded funding under the Pilot Green Transport Fund by EPD for the trial of green and innovative transport technologies. CUHK will use the fund for the acquisition of 2 electric buses, 1 electric medium goods vehicle and 2 electric vans. Agreement was signed with the Government and



Euro V bus operated by Transport Unit in 2011

the trials of various models had started in 2011. The two electric buses are meant to replace two old conventional ones. The addition of electric vehicles to the campus fleet in 2013 is expected to further improve the air quality in CUHK.

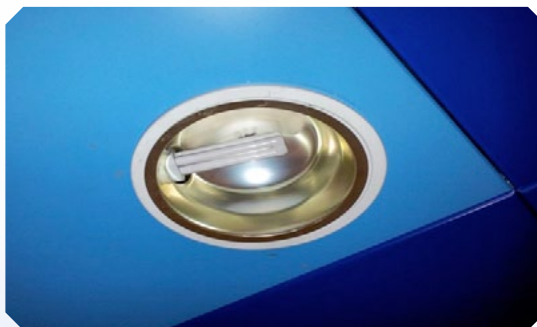
For the health of staff and students, the University plans to prepare an internal indoor air quality (IAQ) guideline to clearly define IAQ objectives, IAQ monitoring practices, and the responsibilities of each office in the maintenance of IAQ on campus. Currently, USO regularly conducts IAQ monitoring for the University buildings.



Trial run of electric van

Green Purchasing

Green purchasing is the selection and acquisition of products and services that effectively minimize negative environmental impacts over their life cycle of manufacturing, transportation, use and disposal. Since 2002, EMO has pioneered the use of various green products, including T5 fluorescent tubes (even when they were not widely available) and low-VOC paints. For centralized tender products, BO and ITSC require green specifications for many products, such that green options are available for a number of often-purchased items in CUHK offices. In collaboration with a construction materials company, at least 1,700 m² of the University's roads have been paved with eco-blocks made from glass, fly ash and recycled aggregate.



Compact fluorescent lamps are adopted to phase out the inefficient incandescent lamps



Biodiesel made of waste cooking oil

The Green Purchasing Policy was introduced in October 2011 to further green the supply chain of CUHK. The policy sets down CUHK's commitment to support green products that have a reduced negative effect on the environment and/or human health, compared to similar conventional products, while maintaining the principles of value for money as well as open and fair competition. A set of guidelines, to be issued in 2012, will provide a list of products that must meet certain green requirements and a list of recommended green products.

B5 biodiesel, a blend of 5% biodiesel with 95% petro-diesel, was used to fuel school buses for a trial run in 2011. The performance of the buses was reported by the drivers to be satisfactory. When the current contract of the diesel provider expires at the end of 2012, the Transport Unit will invite biodiesel suppliers in the next tendering process.

Green Buildings

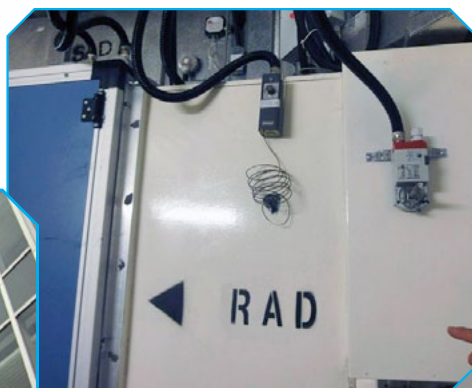
Sustainability is integrated into the designs of the University's new capital projects, including academic, amenities and hostel buildings. We endeavour to design our buildings to harmonize with their natural surroundings and make good use of natural lighting and ventilation so that our buildings will be more energy efficient. We incorporate green features in our buildings like recycling materials, rooftop greening and renewable energy.

In 2009, following the receipt of the BEAM (Building Environmental Assessment Method) 'Gold' rating for the Centralized Science Laboratories Building (named Run Run Shaw Science Building in 2011), CUHK pledged to achieve, where resources permit, the highest standard of green building certification under BEAM or BEAM Plus (or equivalent) for all new buildings. As many buildings

are currently still under construction, it is expected that more CUHK buildings will receive the BEAM Plus 'Platinum' rating in 2012.

In our two new colleges, Morningside and SH Ho, the buildings are designed with a vertical shading panel to provide higher resistance to heat and installed with water-cooled chillers for the air conditioning system, so as to reduce its electricity consumption. To improve indoor air quality, carbon dioxide (CO₂) sensors are installed to optimize the inflow of fresh air to the building for ventilation. With regard to the lighting system, energy-efficient light fittings - T5 fluorescent tubes, compact fluorescent tubes and LED are adopted. Occupancy and optical sensors are installed to deactivate lighting when the place is unoccupied and to deactivate outdoor lighting when natural illumination is sufficient.

Vertical sun shading feature



CO₂ sensor for fresh air control of canteen

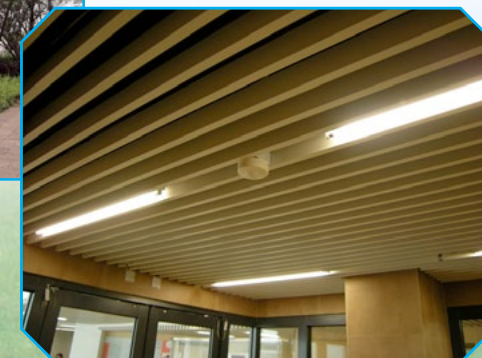
Window-type air conditioner with energy efficiency label 1 for student bedroom



LED street lighting



Occupancy sensor for public lighting



The new buildings are also installed with photovoltaic panels to generate electricity for street lighting, landscaped lighting and building use. Solar panels are also installed for hostels to heat up water for shower. To conserve water, infrared sensor tap is installed for auto cut-off of water flow, and water bleed-off from cooling towers and condensate water is reused for irrigation or flushing. To enhance the environment, native plant species are planted at the podium.

Landscape and Ecology

CUHK prides itself to have the largest and greenest campus in Hong Kong, with over 60% of its campus covered by woodlands and landscaped areas such as natural slopes and roof gardens. One of CUHK's objectives in the CMP is to protect and enhance its green environment. In 2011, a total of 81 trees, 10,178 shrubs, 4,758 floral plants and 5,627 ground cover and 6,631 m² of lawn were planted on campus to maintain our greenery coverage. However, 98 trees had to be removed during the year due to health problems and/or development projects, with the approval of District Land Office. After the completion of building projects, trees will be planted on-site or elsewhere within campus according to the quantity ratio and diameter at breast height ratio to compensate for the removed trees. In addition, 4,940 tree seedlings of native species were planted off-campus at Grassy Hill in 2011 under the Afforestation Scheme of Agriculture, Fisheries and Conservation Department. CUHK has been a member of this scheme for the past five years and has planted over 15,000 seedlings in total.



Solar panel for water heating

Infrared sensor tap



Green podium



On-site tree compensation at Lee Shau Kee Building

Azalea blooming in April around campus



A planting area on Grassy Hill maintained by CUHK



Table 9. Summary of flora planted in the last five years

Year	Trees (No.)	Shrubs (No.)	Flowering Herbs (No.)	Ground Cover (No.)	Lawn (m ²)
2007	106	8,344	5,275	3,285	27,508
2008	351	6,832	3,803	2,539	13,265
2009	221	10,199	3,688	12,191	5,065
2010	182	8,734	5,303	8,511	11,220
2011	81	10,178	4,758	5,627	6,631



White Wagtail

As CUHK is located on the eastern side of the Tai Po Kau Nature Reserve, the campus is rich in flora and fauna. To preserve and enhance the natural environment on campus and strike a balance between physical development and ecological needs, the University has hired an ecologist to study the campus wildlife since 2008. It was recorded that 5 mammal species, 84 bird species, 6 amphibian species, 90 butterfly species and 25 dragonfly species live on CUHK campus. Some of these species are locally rare, protected or endangered. Weiyuan Lake, Chung Chi Stream and natural or semi-natural woodland are the habitats with high biodiversity. To attract more birds and butterflies, native plant species such as Camphor Tree, Fig family including Mountain Fig, Chinese Banyan, Common Red-stem Fig and Ivy Tree were planted to replace the exotic plants to provide shelter, food sources and a suitable habitat for birds and the local wildlife.



Mountain Fig



Dragonfly

Compliance and Monitoring

To ensure full compliance with all environmental legislations, the University strictly monitors ambient air quality, indoor air quality (IAQ), effluent discharge, waste management and environmental noise. A total of 15 environment-related complaints was received, most of which were related to water pollution and construction noise. They were all properly handled, and no non-compliance was found.

In mid-December 2011, the Motor Vehicle Idling (Fixed Penalty) Ordinance came into operation. Under this Ordinance, the driver of a motor vehicle is prohibited from causing or permitting any internal combustion engine, which forms a part of a motor vehicle to operate for more than three minutes in aggregate within any continuous 60-minute period while the vehicle is stationary. The University accordingly requires all drivers on campus to switch off idling vehicle engines to alleviate the roadside air pollution problems.



Wheel wash is installed at the entrance of construction site to reduce dust emission

OUR TEACHING AND RESEARCH

Green Education Programmes

Given the multidisciplinary nature of sustainability issues, CUHK's education in environment, energy and sustainability spreads across almost all faculties, colleges and its general education programmes. Undergraduate and postgraduate programmes with environmental and sustainability elements offered by the University include: Environmental Science, Earth System Science, Geography and Resource Management, Sustainable and Environmental Design, Geoinformation Science, Sustainable Tourism, and Environmental Planning Technologies. Besides, 30 courses related to green topics are provided under the General Education (GE) programme to broaden students' horizons and develop their critical thinking. The lists of these academic programmes and GE programmes are in Appendices A and B respectively.



Group of Environmental Science students

CUHK students won the Hong Kong and Macau Cup in the 12th Challenge Cup held in Dalian



CUHK students have received various awards for coming up with innovative solutions to environmental problems, some of which are highlighted below:

In September, three students of the Department of Mechanical and Automation Engineering, Mr. Lai Wai Yin, Mr. Chan Chi Chong and Mr. Yu Cheuk Him, won the championship at the 'Recycling Energy Product Design Competition' organized by Sony Computer Entertainment HK Ltd. for their self-designed 'WATTer' device that can recharge iPhones and PSPs using the kinetic energy generated when jogging.

In October, CUHK students won the Hong Kong and Macau Cup in the 12th Challenge Cup held at Dalian University of Technology for the fifth time in a row. Among the 51 entries from Hong Kong and Macau, all six projects of CUHK won prizes. Several of the entries feature green elements: 'MoHURD No. 1 site: Post-earthquake Village Reconstruction and Demonstration Project in Ma'anqiao Village', the winner of the 'Special Prize', proposes eco-friendly, humanistic building designs for post-earthquake Sichuan; 'Self-powered, Self-sensing Magnetorheological Damper' is a technology that can be adopted in buildings to make them more earthquake-resistant and can be used in handicapped people's prosthetics as well to generate renewable power, eliminating the need for recharging.

Furthermore, CUHK as one of the leading universities in Asia is constantly visited by world-class scholars and experts who share their views and expertise in sustainability issues at conferences, forums, seminars, workshops and training sessions held at the University. Not only do these events provide opportunities for our students to gain knowledge from and exchange ideas with scholars and professionals, they also encourage collaboration between institutions. Some notable events include:

- (a) In February and March 2011, the CUHK School of Life Sciences organized Hong Kong's first-ever 'Tree Pests and Treatment Workshop' in collaboration with the Institute of Horticulture Science of Hong Kong, with EMO as co-organizer. Experts were invited to talk on tree diseases caused by common tree pests. As this was very successful, a second workshop was held on 16 July 2011.



- (b) On 5 March 2011, a public forum entitled 'Solid Waste in Hong Kong' was organized by the Center for Environmental Policy and Resource Management (CEPRM) with Mr. Elvis Au (Assistant Director of EPD), Prof. Lam Kin Che (Director of CEPRM) and Dr. Chan King Ming (Deputy Convener, NeoDemocrat) and Dr. Ted Chiou (Professor, National Taipei University) to share their views and experience on solid waste issues in Hong Kong.



- (c) On 26 March 2011, the Centre of Strategic Environmental Assessment for China (CSEAC) and the Professional Association for China's Environment co-organized 'Open Forum on the 12th Five-Year Plan: Environment, Resource and Green Development'. Experts from Ministry of Environmental Protection and National Development and Reform Commission were invited to give keynote speeches on goals and measures of energy conservation and pollution mitigation in the 12th Five-Year Plan, China's climate change strategies, and more. The event was sponsored by the 'Hang Seng - Green Bank' scheme.



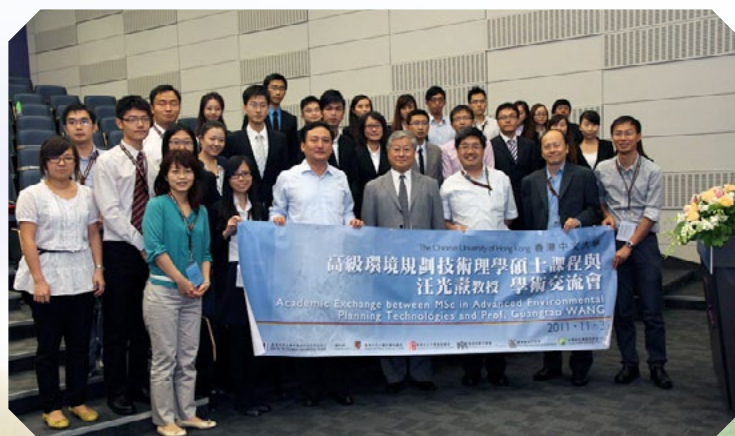
- (d) On 11 June 2011, the Institute of Environment, Energy and Sustainability (IEES) and CEPRM co-organized a public forum entitled 'EIA in Hong Kong: dilemma and prospect' with speakers: Prof. Lam Kin Che (Director, IEES), Dr. Ir. Lo Wai Kwok (Past President, Hong Kong Institution of Engineers), Ir. Albert Lai (Vice-Chairman, Civic Party) and Mr. Tsang Kam Lam (Chairman, EIA Subcommittee, Advisory Committee on the Environment) to share their views and opinions on the dilemma and prospect of EIA in Hong Kong.



- (e) On 22 September 2011, a seminar on 'Environmental Policy and Energy Saving in Finland' was organized by the Department of Geography and Resource Management (GRM) with Ms. Annikki Arponen, Consul-General of Finland in Hong Kong and Macau as speaker to exchange her views and experience with GRM students and colleagues on environmental management issues in Finland and other countries around the world.



- (f) On 3 November 2011, a public lecture on 'New Energy Pilot Cities: Thoughts and Practices,' was delivered by Prof. Wang Guangtao, member of the Standing Committee and Chairman of the Environmental Protection and Resources Conservation Committee, National People's Congress of PRC; former Minister of Construction; and honorary professor of the Faculty of Social Science CUHK.



- (g) On 15 November 2011, an audience of over 500 packed the New Asia Amphitheatre for the I•CARE forum 'Animal Ethics and Moral Progress' presented by Prof. Chien Yeong-shyang, Associate Research Fellow, Academia Sinica, Taiwan, and Mr. Leung Man-tao, local commentator.



- (h) On 23 November 2011, a film show and public forum: In search of Harmony with Nature: Global Vision and Local Action was co-organised by the Center for Environmental Policy and Resource Management (CEPRM) and the CU Tree Project with a world-renowned environmental film producer, Director John Liu of the Environmental Education Media Project, to share his experience in ecological restoration in China and other parts of the world.



Cross-strait Green University Consortium

In May 2011, CUHK, the Nanjing University and the Taiwan Central University formed the Cross-strait Green University Consortium which will host regular seminars, co-organize research teams, develop cross-institution green programmes, share teaching resources and exchange learning experience to boost academic standards and innovation.

The establishment ceremony was officiated by Prof. Chen Jun, President of Nanjing University; Prof. Chiang Wei-ling, President of Central University, Dr. Poon Kit Kitty, Acting Secretary for the Environment of the HKSAR Government, and Prof. Joseph JY Sung, Vice-Chancellor of CUHK on 31 May 2011 on CUHK campus. Over a hundred guests from Hong Kong, mainland China and Taiwan attended. In July, seven CUHK students from different disciplines and 20 students from mainland China and Taiwan participated in the Consortium's debut event, a week-long eco-themed summer camp in Taiwan. The activities fostered collaboration among the students from the three regions, enhanced their awareness of environmental protection, and promoted the importance of applying green ideas to daily life.



Establishment ceremony of Cross-strait Green University Consortium officiated by Prof. Chen Jun (1st left), Prof. Chiang Wei-ling (1st right), and Prof. Joseph JY Sung (middle)



Low carbon salad prepared by Prof. Chen Jun (2nd left), Prof. Chiang Wei-ling (1st right), Dr. Poon Kit Kitty (1st left), and Prof. Joseph JY Sung (2nd right)



The first green summer camp of the Consortium was hosted by Taiwan Central University from 10 to 17 July 2011 in Taiwan with 27 students from the 3 universities to promote sustainable development locally, regionally and globally. The eight-day camp comprised seminars, talks, field trips and visits for the students to obtain knowledge on green concepts and extend their experience to the community



Research Contributions

Sustainability and environmental studies is one of our key research areas. In 2011, there are over 60 on-going and new research projects, with total funding close to HK\$100 million (Appendix C).

CUHK established a new Institute of Environment, Energy and Sustainability (IEES) in April 2011 to serve as a platform for productive and innovative collaboration among scholars of different disciplines. The Institute aims to become a leading research institute in the region. IEES will be guided by an Advisory Committee of international experts and a Steering Committee comprising community leaders, government officials and university officers. It will embark on world-class multi-disciplinary research and education on climate change, energy, sustainable urban environment, public health and environmental policy, and actively engage in public education and knowledge transfer.

On 22 October 2011, the opening ceremony and inaugural symposium of IEES was officiated by Mr. Edward Yau Tang-wah, the then Secretary for the Environment of the HKSAR Government, Prof. Joseph JY Sung, Vice-Chancellor of CUHK, and Prof. Lam Kin-che, Professor in the Department of Geography and Resource Management and the then Director of the Institute.

CUHK is proud to play its role in transferring environment-related knowledge and technology to the community to help protect our planet and enhance the well-being of all peoples. Some important highlights of CUHK's 2011 research contributions are as follows:

- (a) A research team led by Prof. Xiao Xudong (left) and Prof. Li Quan (right) of the Department of Physics successfully developed a low-cost, high-efficiency CIGS thin film solar cell which is 50 times thinner and costs 50% less to produce, compared to crystalline solar cell.



Group photo of officiating guests with guest speakers and members of IEES



- (b) Two novel tree management skills, 'paint coating' and 'micro-drill sampling', were developed by Prof. SW Chiu to prevent trees from dying due to pest infestations and to detect hidden tree diseases at an early stage.



- (c) On 22 March 2011, a research team led by Prof. Linwei Tian and Prof. Ignatius Yu of Division of Occupational and Environmental Health of the School of Public Health and Primary Care shared the findings on Increasing Trend of Primary NO₂ Exhaust Emission Fraction in Hong Kong. The study was published online in the February issue of a leading journal, Environmental Geochemistry and Health.

- (d) Treebot, invented by Prof. Xu Yangsheng (right) and Dr. Lam Tin-lun (left), is a light and manoeuvrable robot which can climb up trunks of different diameters and navigate complex branches with a caterpillar-like motion to monitor tree health and control pests and it can also be used as a tool for ecological observation.



- (e) In November 2011, CUHK displayed 18 of its technological innovations at the China Hi-Tech Fair. One important invention showcased was the project 'Rational Design of Plasmonic Crystals to Increase the Efficiency of Light-Emitting Diodes (LEDs)' developed by Prof. Daniel Ong Hock Chun (front) from the Department of Physics and his research team. The project shows a promising way to drastically improve the efficiency of energy-efficient LED lamps and help the TV and display industries become greener.



Raising Awareness

The University spares no effort to cultivate the social and environmental awareness on campus and beyond. Service learning is also organized to provide valuable exposure to students in different parts of the world. Some notable events in 2011 are:

- (a) The third workshop of the ESA Programme took place on 2 and 5 November 2011. Experts from the University and NGOs spoke on, inter alia, carbon auditing, protecting flora and fauna, green cooking and green handicrafts, and all forms of recycling. A total of 87 certificates was given out to the staff and student ambassadors. Staff ambassadors will later use the knowledge acquired from the workshops to perform carbon audit for their own units.



- (b) Green x Life Seminars were held by Lee Woo Sing College in November 2011 to inspire the attendants to achieve a green life in daily practice.



- (c) Eco-tour to Guangxi was organized by Shaw College in May 2011.



- (d) Two students from CUHK took part in the 2041 Antarctic Expedition in March 2011, together with participants from all over the world, to explore the continent's ecosystem and learn about climate change.



- (e) University YMCA @CUHK organized a 'Loving Trees - Indonesia Green Trip' in July 2011 to spread the message of forest protection to Yogyakarta, a city in Java, Indonesia, which suffered from serious deforestation.



- (f) Green student bodies such as Green World proactively organized green activities on campus and staff societies such as Green Working Group regularly provided seminars, guided tours, talks and other activities to raise the awareness of environment conservation among the University community. Committee members of Green World are all green and energetic.



- (g) Green World organized organic farming activity for the staff and students.



- (h) Green World joined hands with Green Wood of HKU to organize a visit to landfill and Eco-park in May 2011.



- (i) Green Education Group organized campus tree walks and bird watching tours, with sponsorship from Hang Seng Bank, for staff, students and members of the public to promote the importance of tree protection. The second phase of the exhibition organized by the Group, 'Science and Art of Trees and Birds of CUHK Exhibition', was held at Lee Shau Kee Building.



- (j) Alumni and other friends of CUHK showed their care for the trees of CUHK by helping to attach tree tags in the Alumni Homecoming Day co-organized by Alumni Affairs Office and Green Education Group.



OUR OUTREACH TO COMMUNITY

As a socially responsible higher education institution, we also encourage our staff and students to interact with the community and engage in community service in Hong Kong, China and around the globe. We hope not only to fulfill our social responsibilities but also cultivate talent and transfer our knowledge through reaching out to the community.

I•CARE Programme

In September 2011, CUHK launched the I•CARE Programme with an endowment fund of HK\$100 million. The programme aims to help students develop a long-term interest and commitment to serve the local, regional and international communities by integrating their specialised knowledge with social and civic engagements in their life and future career, with sustainability being one of the key components. I•CARE supports a range of major categories of social and civic engagement programmes, including service projects and self-initiated action-research projects, internships in NGOs, etc. Furthermore, I•CARE established the Social Enterprise Startup Scheme in 2011. The scheme provides start-up financial and mentoring support to the Grand Finalists of the Hong Kong Social Enterprise Challenge, and helps students put their creative business ideas into meaningful social ventures.



Members of the Steering Committee for Promoting Personal Development through Social and Civic Engagement take a group photo with students joining the I•CARE Programme

Cultivating Talent and Innovation

In 2009, the Faculty of Engineering, collaborating with the Innovation and Technology Commission, established the Innovation and Technology Student Club to help Form 3 to Form 6 secondary school students who are interested in science, technology and engineering develop their talents by organizing various interactive activities, including future technology seminar series, research mentorship, technology reporter, summer camps and more. Inventions by these young members are showcased at an annual InnoCarnival. With environmental protection being the theme for 2011, the inventions last year included an 'i-Device' that enables remote control of electrical appliances in classrooms to save energy, turnstile power generators, a non-toxic antiseptic made from Chinese medicine, and many more.

To educate younger children on green technologies, 'iTour@CUHK', another event of the InnoCarnival, was jointly organized by the Faculty of Engineering and the Centre for Innovation and Technology and supported by the Innovation and Technology Commission. In this popular activity, tours were organized for primary students, secondary students and parents to visit CUHK and observe the use of green technologies on campus.



Ms Leung Yun Yee, inventor of i-Device

OUR AWARDS

For more than four decades, CUHK has been striving for excellence in building a sustainable campus and has spent relentless effort in protecting the natural environment of our campus. Over the years, our efforts have been recognized by numerous awards for our outstanding performance in this respect. Below is a list of these awards in recent years:

Year	Award	Organizer
2006	Gold award in the Schools (Tertiary) Category of the First Hong Kong Energy Efficiency Awards Certificate of Appreciation - Power Smart Contest	The Electrical and Mechanical Services Department Friends of the Earth (HK)
2008	Silver award (Sectoral Award - Public Sector), Hong Kong Awards for Environmental Excellence*	Hong Kong Awards for Environmental Excellence (HKAEE), organized by the Environmental Campaign Committee, Environmental Protection Department and various groups
2009	Gold award (Sectoral Award - Public Sector), Hong Kong Awards for Environmental Excellence* 'Class of Good' EnergyWi\$e Label U Green Award 2009 Gold BEAM rating awarded to Run Run Shaw Science Building (for environmentally-friendly building design)	HKAEE HKAEE U Green Magazine Hong Kong BEAM Society
2010	'Class of Excellence' EnergyWi\$e Label 'Class of Good' WasteWi\$e Label Commendation Certificate, Commendation Scheme on Source Separation of Commercial and Industrial Waste 2009/10 Blue Certificate, Quality Water Recognition Scheme for Buildings (University Library, Institute of Chinese Studies and Elisabeth Luce Moore Library)	HKAEE HKAEE Environmental Protection Department Water Supplies Department
2011	Gold award, Commendation Scheme on Source Separation of Commercial and Industrial Waste 2010/11 'Class of Excellence' EnergyWi\$e Label 'Class of Excellence' WasteWi\$e Label Blue Certificate, Quality Water Recognition Scheme for Buildings (University Library, Institute of Chinese Studies and Elisabeth Luce Moore Library)	Environmental Protection Department HKAEE HKAEE Water Supplies Department

* CUHK is the first local University to have won the HKAEE Silver Award, and is also the first and only local University to have won the HKAEE Gold Award as of 2011.

THE WAY FORWARD

Setting Medium-Term Targets

Since the development of 'sustainability indicators' in 2006, we have made substantial progress on all fronts over the years as detailed in the earlier chapters of this report. As universities in Hong Kong transit from a three-year undergraduate curriculum to a four-year one in 2012, and in anticipation of the 1/3 expansion in our undergraduate student population, we must accelerate our efforts to reduce the environmental impact on our campus as a considerable number of new buildings are being constructed, and the university community, both students and staff, will also be much expanded.

While the University has pledged in our Campus Master Plan to cut energy use (per capita) and GHG emissions (per capita) by 25% and 20% respectively by 2025 (from the base figures of 2005), we are working on our medium-term sustainability goals, for carbon emissions, energy conservation and waste management in particular, taking into account new standards and opportunities arising.

Besides the plan to launch a set of comprehensive Green Purchasing Guidelines in 2012 as reference for our offices and contractors, we will set new short to medium term sustainability targets as performance indicators. We will review existing policies and establish new ones, optimize management practices, instill cultural and behavioural changes on campus and secure additional internal and external resources in order to meet these targets.

Building a Culture of Sustainability

The University recognizes that staff and students have a major role to play in building a sustainable campus, and cultural and behavioural changes based on awareness are fundamental to ongoing success. To this end, a Green Office Programme is being developed and will be launched in 2012. It will serve as a platform to facilitate engagement, solicit leadership commitment, outreach to individual staff and students, and further promote implementation of green practices on campus.

While the growing student and staff population in 2012 will pose tremendous challenges, it also presents a golden opportunity to bring the sustainability message to the awareness of a larger group and enable us to make a greater impact. The University will work with student bodies to incorporate more green elements into activities like orientation camps and seek more creative ways to enhance student and staff engagement.

Enhancing Green Infrastructure

We will continue with our street lamp retrofitting project - the largest ever undertaken by tertiary institutions in Hong Kong - to replace SOX lamps with energy-efficient LED lamps for approximately 600 street lamps on campus.

A new water treatment plant near Fong Shu Chuen Building is expected to be completed in 2012. It can help save more than 1,000 m³ of potable water per day.

Furthermore, the MTR Corporation will complete the construction of an additional MTR station exit north to the existing one in 2012. A new walking trail starting from this new northern MTR exit, via the escalators in the new Two Integrated Teaching Buildings and the express shuttle lifts in the William MW Mong Building, will offer a quick and convenient alternative to taking school buses from the station to central campus, supporting the University's endeavour to maintain a pedestrian-friendly campus.

The University will continue its efforts to enhance its green infrastructure in the years to come.

FEEDBACK

To help us enhance our performance, you are most welcome to provide your comments and suggestions by sending us email or visiting our website.

Campus Planning and Sustainability Office

Tel: 3943 3927

Email: cpso@cuhk.edu.hk

Website: <http://www.cuhk.edu.hk/cps/>

APPENDICES

Appendix A

Programmes Covering Environmental and Sustainability-related Issues Offered by CUHK in 2011

Faculty	Undergraduate Programme	MPhil / PhD Programme	Taught Master Programme
Arts	Anthropology Cultural and Religious Studies	Anthropology	MA in Anthropology
Education	Liberal Studies	-	-
Engineering	Electronic Engineering Energy Engineering Mechanical and Automation Engineering	Mechanical and Automation Engineering	MSc Mechanical and Automation Engineering
Medicine	Public Health	-	Master of Public Health MSc in Epidemiology and Biostatistics
Science	Environmental Science Biology Biochemistry Food and Nutritional Science Earth System Science	Environmental Science Biology Food and Nutritional Science	MSc in Nutrition, Food Science and Technology
Social Science	Architecture Geography and Resource Management	Architecture Geography and Resource Management	Master of Architecture MSc in Sustainable and Environmental Design MSc in Architectural Conservation and Design MSc in Urban Design MSc in Geoinformation Science MSc in Sustainable Tourism
Inter-faculty	-	Earth System and Geoinformation Science	MSc in Earth System Science MSc in GeoInformation Science MSc in Advanced Environmental Planning Technologies

Appendix B

Sustainability-related General Education Courses Offered by CUHK in 2011

Area	Course
(B) Nature, Science and Technology	Green Electronic Gadgets
	Energy and Green Society
	Nature Conservation in Hong Kong
	Climate, Energy and Life
	China's Mega-projects in the New Millennium
	Resources Issues in the Age of Globalization
	Earth as seen from Space
	Environment in Hong Kong: the X Files
	Natural Hazards
	Natural Wonders of the World
	Plants for Treasure and Pleasure
	Wonders and Insights in Bio-science
	Chemistry in Action
	Chemistry in the Kitchen
	Forces of Nature
	Nanotechnology and Our Lives
	Exploring the Enigmatic Oceans
	Perspectives in Meteorology
	Technology and Life
(C) Society and Culture	Experiencing Architecture
	The Japanese Environment: Destruction and Conservation
	Hong Kong and the Pearl River Delta
	China's Environmental Crises
	Sustainable Development
	Understanding Ecotourism
	Pursuit of Ideal Living Environment
	Food and Hunger
	Cities in a Changing World
	Big Issues of Globalization
	Issues in Environmental Education
	Nature and Culture

Appendix C

New and On-going Sustainability-related Research Undertaken by CUHK in 2011

Department	Project Title
Department of Chemistry	Deciphering the Self Assembly Properties of Main Chain Polytriazoles - Novel Materials from 'Click' Synthesis
	Synthesis and Design of New Photocatalysts for Degradation of Toxic Organic Compounds
	Advanced Materials for the Photocatalytic Conversion of Carbon Dioxide to Fuels by Sunlight
Department of Decision Sciences and Managerial Economics	Integration of Emissions Management and Supply Chain Optimization
	Demand and Network Forecasting, Airport Productivity and Carbon Emission Control in the Aviation Industry
Department of Electronic Engineering	A New Energy-efficient Amplifier-less Pipelined ADC Technique
	Automated and Continuous Monitoring of Polycyclic Aromatic Hydrocarbon in Air Pollutants
	High-efficiency SIMO Power Converter for SoC
Department of Geography & Resource Management	Bargaining for Nature: The Treatment of 'Environment' in China's Urban Planning System
	Spatial-temporal Image Fusion for Monitoring Aerosols in Hong Kong and the Pearl River Delta
	Program for Geographical Modeling and Geocomputation
	A Green CUHK Campus Environment: Fusion of Reality and Virtuality in VGE
	'Walled Buildings', 'the Right to the City', Place Governance and the Delayed Amendment of an Outdated Planning Ordinance: An Institutional Analysis
	Hydrological Variability and Its Implications for the Ecological Water Requirement under the Changing Environment in the Pearl River Basin, South China
	The Institutional Hurdles to Effective Strategic Environmental Assessment Practice in China
	Economic Reforms and Land Use/Land Cover Change in Yunnan: Between Centralised Policy Planning and Local Implementation
	Alternation of the Hydrologic Cycle and Sediment Flux in Response to Climate Change and Human Activities in the Pearl River Basin
	Environmental Inequality: Community Socioeconomic Characteristics and Exposure to Air and Noise Pollution in Hong Kong
Build and Operate CBERS-02B Satellite Ground Receiving Station to Support Earth Resources and Environmental Monitoring	

Department	Project Title
Department of Government & Public Administration	Local Knowledge of Environmental Change and Risk: A Comparative Study in Guangdong and Guangxi
Department of Mechanical & Automation Engineering	Energy Harvesting from Vibration Using Piezoelectric Materials
Department of Physics	Semiconductor Nanomaterials Based Solar Energy Conversion: From Fundamentals to Applications Key Fabrication Know-hows for CIGS Thin Film Solar Cell by Co-evaporation Method
Department of Systems Engineering & Engineering Management	Studies of Carbon Audit System and Method for Residential Buildings in Changsha City
Faculty of Law	Developing Effective Regulation on Air Pollution Control - The Case of Beijing Smog
Institute of Space and Earth Information Science	Development of a Fine Forecasting System for Coastal Ocean Dynamic Environment Investigation and Evaluation of Possible Sea-level Changes and Their Potential Impacts on the Coastal Environment of Hong Kong Using Satellite Data Investigating the Impact of Coastal Water Quality on Hong Kong's Coral Environment Using Satellite Remote Sensing Oil-spill Monitoring and Its Impact on Coastal Environment in Hong Kong's Coastal Waters Using Satellite Remote-sensing Data Study on Synergistic Use of Optical and Microwave Remote Sensing Data to Monitor Rice Growth in Southern China An Experimental Prediction System for Rainfall-triggered Landslides in Hong Kong Using ALOS PALSAR Interferometry and Geospatial Datasets Development of Coastal Environment Monitoring and Prediction System (CEMAPS) in Hong Kong and Pearl River Delta Region Water Quality Monitoring from Multi-satellite Observations in the Coastal Region of Hong Kong and the Pearl River Estuary

Department	Project Title
School of Architecture	Towards Urban Planning Strategies to Improve the Wind Environment in High Density Cities Based on Better Understanding of the Urban Morphology by Using Large Eddy Simulation Model (LES)
	Design of Nature School for Nanhui Dongtan Wild Life Sanctuary, Shanghai, China
	Urban Climatology for Tropical and Sub-tropical Regions
	Consultancy Services for Passive Design Review of BEAM Plus
	Air Ventilation Assessment (AVA) for Indoor Recreation Centre in Area 14 (Siu Lun), Tuen Mun
	Macau Urban Climatic Map Study - The 2nd Stage Study
	Heritage Consultancy in Project Titled 'Revitalization of Old Tai Po Police Station into a Green Hub'
	Kai Tak River Green Corridor - Community Education Project
	Design and Construction of Eco-Base Prototype for Nature Reserve
	The Green Hub - KFBC's Submission to the Revitalising Historic Buildings through Partnership Scheme
	Developing a Multi-scale Integrated Platform to Mitigate the Urban Heat Island Effects from the Perspective of Urban Planning in PRD Region
	A Research on the Methodology of Sustainable Urban Planning to Achieve 'Low Carbon' City in the PRD Region, China
	Regenerating Macau-Zhuhai Water Space
	Provision of Consultancy Services 'Interim Upgrading of the BEAM Assessment Standards' Urban Climatic Map and Standards for Wind Environment - Feasibility Study
School of Life Sciences	The Contribution of Vertical Greening on Human Bioclimate and Carbon Footprint in Built Environment
	Responses of Intertidal Community to Climate Change: An Integrated Ecological and Genetic Approach
	Balancing Bacteria and Disinfection Byproduct Contaminations in Municipal Water Supply
	Potential Impacts of Global Climate Change and Environmental Deterioration on Coral Reefs in South China Sea
	R&D on the Key Technology for Resource-conserving Urban Greenery

Department	Project Title
	<p>Potential Impacts of Heavy Metal and Organic Pollutants on Corals and Coral Reefs in South China Sea</p> <p>Responses of Intertidal Community to Climate Change: An Integrated Ecological and Genetic Approach</p> <p>Ecological Sustainability of Vegetated Steep Soil Cutslopes</p> <p>UGC Area of Excellence (AoE) Centre for Plant and Agricultural Biotechnology</p>
The Jockey Club School of Public Health and Primary Care	<p>Health Effects of Indoor Air Pollution in Primary Schools in Hong Kong</p> <p>Estimating the Effect of Cold Weather and Cold Spells on Mortality in 3 Asian Cities: Hong Kong Taipei and Kaohsiung</p> <p>Environmental Study in an Asbestos Plant in Chongqing China (Project I)</p> <p>Effect of Hong Kong's Ban on Smoking in Public Places on Incidence of Acute Myocardial Infarction</p>