

節能環保 愛護校園

中文大學擁有全港最大的校園，面積達一百三十四公頃，有各類型建築物一百二十多座。大學迅速發展，校園人口不斷增加，現時教職員和學生人數已經超過二萬人，是一個生機蓬勃的小社區。為了保護這個社區的環境，以達到可持續發展的目的，大學設立了有效機制，並制定了各種措施，以確保師生可以在這個美麗校園享受健康的生活。本期《可持續校園》介紹中大幾項環保和節約能源的特色。

潔淨無污染的可再生能源

風力、水力和太陽能由自然產生，在應用時不會製造污染環境的有害物質，屬可持續的再生能源。中大非常重視保護環境，所以積極採用這種潔淨能源，現時在校園應用的有太陽能和水力。邵逸夫夫人樓的「太陽能花園」，就是使用光伏板吸收太陽能，以供照明及噴水池之用。

而中大是香港首間安裝太陽能熱水器的大學。第一套熱水器於二零零四年安裝在聯合書院的張祝珊師生康樂中心，第二套則於零五年安裝在大學體育中心。這兩套太陽能熱水器是真空熱導管式，比以前的平板式優勝，收集及傳送熱力的效能更高，日照時的水溫可達攝氏九十度。太陽能除供應熱水外，亦可支援其他電器。大學亦獲大學撥款委員會撥款，將在全校二十七座學生宿舍和大學游泳池更衣室安裝太陽能熱水器。



邵逸夫夫人樓的太陽能花園
Solar garden at Lady Shaw Building

現時安裝在張祝珊康樂中心的一套太陽能系統有十一組管，熱水供應量足夠每日一百六十人使用，體育中心的則有二十一組導管，可供二百五十人使用，中心毗鄰的汾陽樓亦得享其利。

- 夜間沒有陽光，太陽能會發揮作用嗎？
太陽能系統的真空外層有保溫作用，減少熱力流失，即使在晚上和沒有日照的時間也可以保持水溫。
- 冬天裡，對熱水的需求大增。系統可以應付二十四小時的熱水供應嗎？
太陽能熱水系統是儲熱式。儲存的熱水耗盡，太陽能未能即時補充足夠的熱水時，系統會自動轉回使用傳統能源。而在夏天，只要儲一小時的太陽能，便可供應一百五十個學生的使用量，儲幾小時已足夠一天之用。所以上述兩幢大樓在夏秋兩季差不多無須繳交電費。

此外，中大得天獨厚，校園有兩條天然山溪，大量溪水經大學流入吐露港。為了善用這項自然資源，不單以山水來灌溉花草和沖廁，就連泵水往儲水池的水泵，也是利用水力推動的。方法就是在溪澗安裝水錘泵，善用了溪水下流的動能，將水加壓泵上儲水池。約十分一流經水錘泵的溪水會被抽往距水錘泵四十多米高的儲水池，該泵可用上三十年，不耗能源，也不會如電泵般產生廢氣。

有助室內冬暖夏涼的玻璃

新建的科學實驗室專門設計意念創新，而且著重有效節省能源。大樓的每層樓正面都安裝了絕緣玻璃組件，這些以歐洲先進技術製造的組件可以控制吸熱量，從而減輕樓宇內部空調的負荷。每個組件由低輻射多層玻璃構成。多層玻璃是兩塊或多塊玻璃黏合一起，每塊玻璃之間有一片薄膠膜，作用是減低太陽輻射。這種玻璃安全和隔音，常用於機場、博物館、錄音室和學校等建築物。低輻射玻璃的



張祝珊師生康樂中心的太陽能熱水器
The solar hot water system at the Cheung Chuk Shan Amenities Building

優點是冬天可以減少熱量流失，夏天則降低吸熱量，還可以阻擋及反射一定分量的紫外光和紅外光而不損日光照射。採用這種玻璃組件作為正面幕牆，大樓可以減少室內的日間人工照明。此外，大樓內也安裝了日光感應器，在天然光線充足時自動調暗或關掉燈光，以節省能源。大樓的空氣調節系統則採用水冷式，預期比風冷式的系統節省兩成能源。

循環使用的環保地磚

中大校園路面自數年前開始已陸續鋪上環保地磚，維修地底的公用設施時，只須挖走地磚，工程完成後重新鋪回即可。這樣可以避免從前般使用重型器械鑿開混凝土路面，工程製造噪音、沙塵和大量廢料。鋪上環保磚的路面也較為美觀。去年大學物業管理處更和外間的建材公司合作，收集混凝土廢料以製造新一代的環

保地磚。這種俗稱玻璃磚的新環保地磚成分包括玻璃沙、粉煤灰和循環物料，可減少使用河沙、水泥和碎石等材料，而最重要是可以回收再用。大學計劃在二零零六至零七年重鋪二千五百平方米的道路，現時已重鋪的地方有環迴東路、夏鼎基運動場旁邊小路、信和樓行人路、崇基路近教堂行人路，以及新亞校巴士站旁小路，合共一千七百多平方米。

中大對保護環境不遺餘力，大學更設有節約能源工作小組，制定了一系列策略及計劃，以協調及推動節約能源，例如翻新校園照明系統；安裝水冷式空調系統、自動感應器及樓宇設備自動化系統等。中大的節能成績斐然，去年更奪得特區政府機電工程署第一屆「能源效益獎」的大專院校組金獎*。

* www.cuhk.edu.hk/greencampus/b5/works/eca.htm

Our Eco Campus



大樓正面的絕緣玻璃組件
Story-high, insulated glass units on the southern façade of the Centralized Labs

The University takes active measures to protect its campus environment and to achieve sustainable development. Prominent among these are energy-saving practices.

Renewable Energy

The University is a pioneer in the use of renewable energy. We were the first university in Hong Kong to have a solar hot water system. The first set was installed in the Cheung Chuk Shan Amenities Building of United College and the second set was installed in the University Sports Centre. Solar energy also supplies electricity for other uses. The Lady Shaw Building is fitted with photovoltaic panels which absorb solar energy and convert it into electricity for lighting and the fountain. Solar-powered water heaters are being installed in the showers of 27 student hostels and the swimming pool.

「政府非常關注節約能源及善用地球資源。中文大學積極回應了政府的呼籲，參加第一屆『能源效益獎』，獲得大專院校組金獎，印證了他們的努力和成就。我希望中大和所有獲獎機構可以發揮帶頭作用，在社區更進一步推動節約能源，政府一定大力支持。」

機電工程署署長何光偉太平紳士

'The government attaches great importance to energy conservation and making the best use of resources. Responding actively to the government's call, The Chinese University won the gold award in the Tertiary Institutions sub-category of the First Hong Kong Energy Efficiency Awards, which is a testimony to its efforts and achievements. I hope CUHK and the other winning organizations will take the lead in promoting energy conservation in the community. They can be assured of the government's whole-hearted support.'

Mr. Ho Kwong-wai, JP, Director of Electrical and Mechanical Services



環迴東路鋪上環保地磚
Eco-glass blocks on Campus Circuit East

A solar water heating system works even during the night. Its vacuum outer layer insulates against heat loss and maintains the water temperature during cloudy or sunless times of the day. In winter, when hot water is depleted and the system cannot heat enough water in time, the system will automatically switch to conventional energy sources. In the summer months, an hour's sunlight can provide enough energy for 150 students and several hours will meet their needs for the whole day. Cheung Chuk Shan Amenities Building and the University Sports Centre have almost no need to pay electricity bills in summer and autumn.

The University also capitalizes on its abundant water sources. A hydraulic ram is used to pump nullah water to storage sites for irrigation and flushing purposes.

Green Building

The insulated glass units on the southern façade of the new Centralized Science Laboratories Building can control heat gain and allow visible light to pass while blocking and reflecting certain amounts of ultraviolet and infrared light. This reduces the need for air-conditioning as well as artificial lighting. The building also features daylight sensors and an efficient variable air volume design in its air-conditioning system.

Eco-Glass Blocks

Some 1,700 square metres of the University's roads have been repaved with eco-glass blocks. When repairs on underground utilities are needed, the blocks can be easily removed and repaved. The EMO has also been producing a new generation of eco-glass blocks with a construction materials company. Made from glass, fly ash and recycled aggregate, these blocks are recyclable. They are also aesthetically pleasing. The University plans to repave 2,500 square metres of road in 2006-07.

Recognition

The University's energy saving efforts were rewarded with a gold award in the Schools (Tertiary) Category of the First Hong Kong Energy Efficiency Awards organized by the Electrical and Mechanical Services Department of the HKSAR Government last year.*

* www.cuhk.edu.hk/greencampus/en/works/eca.htm

感應自然環境的開放型教學大樓



綜合教學大樓外觀設計
Simulation of the Teaching Complex

香港高等教育大規模擴張始於一九九零年代。今天，中文大學的各項教研活動日益蓬勃，教學設施已逐漸不敷應用。校園西陲正在興建的綜合教學大樓，由本地著名建築師嚴迅奇精心設計，籌建數年，啟用後預期可稍紓教學設施的需求壓力。

嚴迅奇解釋大樓的基本設計概念時說：「大樓的建築設計和空間布局主要突出一個明亮開放的形象。整座建築物的定向在強調感應周圍的自然環境。」

綜合教學大樓高八層，總建築面積一萬二千六百多平方米。大樓低層有大小不同的演講室多個，各容納一百五十至四百五十人不等。高層設辦公室、會議室和語言實驗室，中層為課室和科研室。大樓依地勢而築，正門在大學道，另在馮景禧樓側有停車場及其他入口。大樓設施可容納二千八百名學生同一時間上課。中央道一面的中層有行人天橋，與對面山坡上的聯合道連接，下課時大樓內人群可以利用天橋和各層的出口有效疏散。天橋更便利往返校園中部和山上各處的人士，行動不便者日後前往聯合道更感安全。

大樓在構思、設計及建造方面，均務求保育環境。樓內的各種設備，以符合能源效益為主，包括使用省電燈泡、採用自動感應控制照明系統，以及安裝省電的空調系統等。大樓的環境盡量綠化，周邊種植草木，加設戶外長椅，使該處成為校園另一個優美的休憩場所。大樓預計於二零零八年下旬竣工，新學年即可啟用。教學大樓建築委員會主席協理副校長蘇基朗教授說：「現在大學的每項建築工程，都按可持續發展的原則設計及執行；這是大學發展策略的其中一個重要環節。這座綜合教學大樓當然不會例外。」

An Environmentally Sensitive Teaching Complex

The architecture and layout of the Teaching Complex at Western Campus is designed to convey a bright, open and out-reaching image. The overall emphasis is on responsiveness to the natural surroundings,' explained Mr. Rocco Yim, renowned local architect who designed the Teaching Complex currently under construction on Western Campus.

The eight-storey building with a construction area of 12,600 square metres will have facilities that allow 2,800 students to have classes at the same time. It will house lecture rooms, classrooms, laboratories, offices, conference rooms and language laboratories. Built in harmony with the natural terrain,

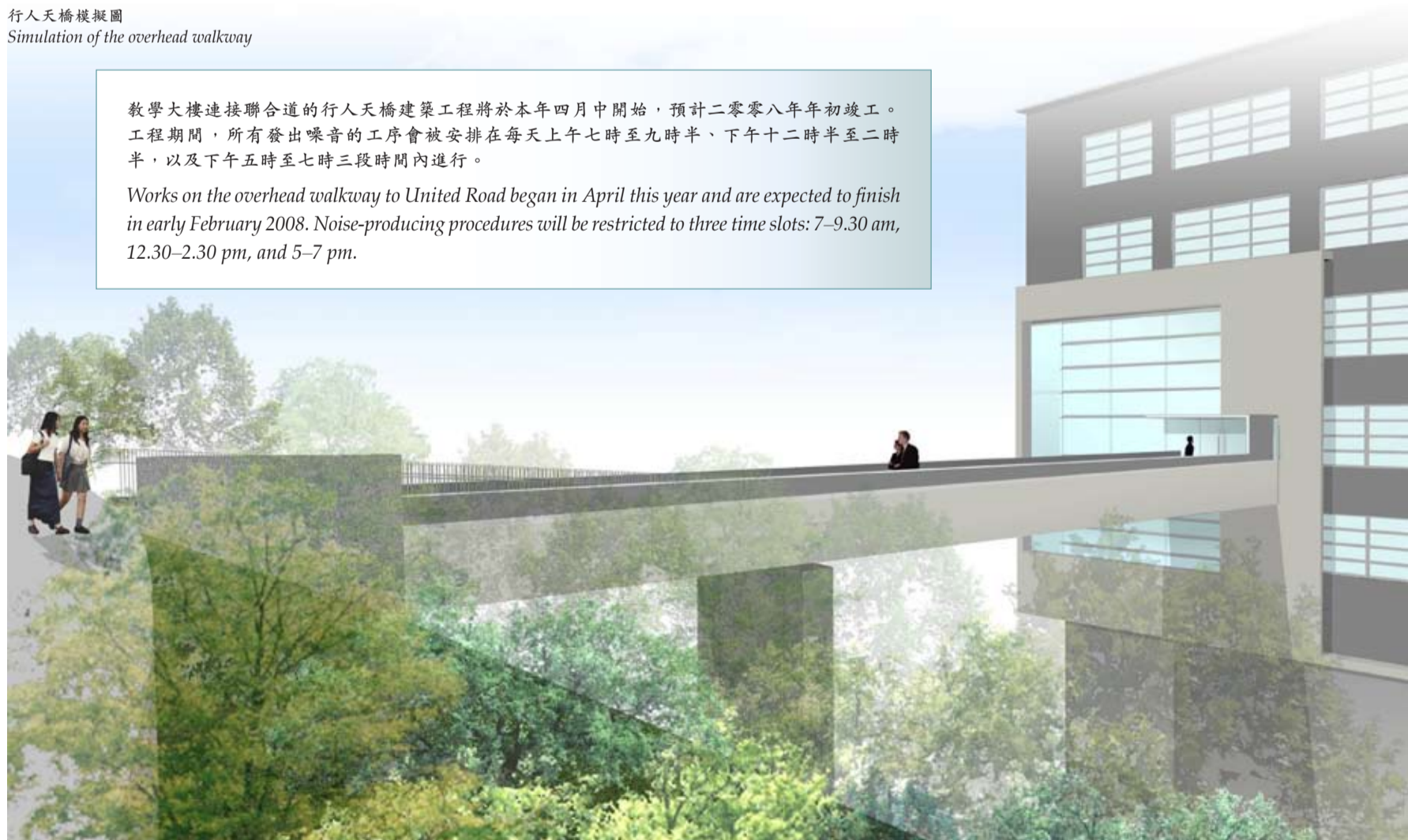
the building will have a front entrance that opens on to University Avenue and a car park and other entrances next to the Fung King Hey Building. An overhead pedestrian walkway will extend from the middle of the façade facing Central Avenue to connect with United Road on the opposite slope.

The building will be fitted with eco-friendly facilities, including energy-saving light bulbs, motion sensors and an energy-efficient air-conditioning system. Greenery will be planted around the building to create a relaxing atmosphere. The Teaching Complex is targeted for completion in the second half of 2008, in time for the beginning of the new academic year. ✨

行人天橋模擬圖
Simulation of the overhead walkway

教學大樓連接聯合道的行人天橋建築工程將於本年四月中開始，預計二零零八年年初竣工。工程期間，所有發出噪音的工序會被安排在每天上午七時至九時半、下午十二時半至二時半，以及下午五時至七時三段時間內進行。

Works on the overhead walkway to United Road began in April this year and are expected to finish in early February 2008. Noise-producing procedures will be restricted to three time slots: 7-9.30 am, 12.30-2.30 pm, and 5-7 pm.



斜坡鞏固及美化工程

位於士林三巷近逸夫書院網球場和新亞坊近新亞書院人文館的兩個斜坡，一九七零年代由填土堆成，近年常有泥土鬆脫現象。校園岩土事務委員會仔細討論後，同意該兩個斜坡須進行鞏固工程，主要工序是將表面不穩固泥土清除及回填。工程已安排在本年初開始。

校園景觀美化委員會亦審核及批准，把逸夫書院網球場附近斜坡的十棵樹木清理，另一棵則須移植。工程完成後，將會加種二十六棵新樹及植草，以美化該處。而新亞書院靠近人文館斜坡的原有樹木則會保留，工程完成後，更會加種灌木及植草以作美化。



(上) 逸夫書院網球場附近斜坡工程前面貌
(Above) Slope near Shaw College Tennis Court before the project

(右) 工程後面貌 (電腦模擬)
(Right) The slope upon completion (computer simulation)

Slope Stabilization and Landscaping

Slopes at Residence Lane 3 near the Shaw College Tennis Court and New Asia Circle near the New Asia College Humanities Building, which had been constructed with backfill soil during formation works in the 1970s, had been showing signs of loose soil in recent years. The Standing Committee on Campus Geotechnical Matters carefully considered the slope stabilizing proposal and agreed that action was immediately required. Works on the slopes are scheduled to commence in early 2007. They chiefly involve removal of loose soil and backfill compaction.

As approved by the Campus Landscaping Enhancement Committee in October 2006, 10 trees will be removed and one transplanted at slopes near the Shaw College Tennis Court. To enhance greenery, 26 trees will be planted and the slope covered with grass after completion of works. As for the slope near the Humanities Building at New Asia College, trees will be unaffected by stabilization. Ground vegetation and dead trees will be removed during the works. Upon completion, the slope surfaces will be landscaped with shrubs and grass.



聯合學生宿舍除舊更新

聯合書院湯若望宿舍及恒生樓 (左圖) 將於暑假期內進行整修工程，以改善現有設施及提升可使用空間。工程包括修葺宿舍浴室、小廚，以及房間和公共地方的屋宇設備，並改善消防系統及走火通道，以符合最新的消防條例要求。整修後宿舍的空間將更寬敞，大堂採開放式設計，氣氛親切高雅，環境更舒適，通往宿舍庭園的地方自然怡人，有利學生交流。

Renovation of United College Hostels

The Adam Schall Residence and Hang Seng Hall (left) of United College will undergo major renovations of their facilities during the summer vacation in order to optimize the use of space. These will consist of upgrading of lavatories, pantries, building service provisions in bedrooms and communal areas; enhancement of the fire fighting and protection system and fire escape in compliance with the latest regulations; and spatial reorganization. The last item will include an open plan design for the entrance lobby which will turn it into a friendly and elegant space opening to the courtyard. This will foster interaction among students and create a soothing atmosphere.



水藻沉澱物令溪水看來混濁
Algae sediment made the stream appear murky

查獲污染小橋流水元兇

小橋流水遭污染已有一段時間。校園發展處、物業管理處、環境政策與資源管理研究中心、大學安全及環境事務處，以及生物系王保強教授和化學系余濟美教授組成的專家小組，多次到該處抽取溪水及沉澱物樣本化驗，以找出溪水受污染的源頭，結果發現主要原因是溪流被滲進高導電性酸水。這種污染物干擾了溪水的生態系統，令水藻迅速大量繁殖。這種藍綠色的水藻壽命很短，死藻沉在溪水底，沉澱物把溪水變成藍色，溪水其實仍然清澈。工作小組將繼續調查酸水滲進的源頭。

Chung Chi Stream Pollutants Identified

The Task Group on Chung Chi Stream Pollution, which consists of specialists from the Campus Development Office, the Estates Management Office, the Centre of Environmental Policy and Resources Management, and the University Safety and Environment Office, Prof. Wong Po-keung of the Department of Biology and Prof. Jimmy Yu of the Department of Chemistry, has made many field visits and conducted laboratory tests on the water quality and sediment of the stream. The task group concluded that the main source of pollution was high-conductivity acidic water entering the stream due to seepage.

The pollutants disturbed the stream's ecosystem and gave rise to an algal bloom. The algae, bluish green in colour, grew rapidly and in large amounts, becoming the dominant species in the water. This microscopic algae species has a very short life span and the dead algae sank to the bottom of the stream. The sediment turned the stream a greyish blue though the water actually remained clear. The task group will keep investigating the source of seepage.