



# Building an eco-friendly future

With more than 6.8 million people residing in an area of about 1,100 square kilometres, Hong Kong is among the densest cities in the world. How Hong Kong people live has always been a fascination for foreigners. Our city has evolved into an amazing web of towering skyscrapers, highways, bridges and railroads that form an ever evolving and energetic metropolis.

But behind the bright lights and the city facade lurks a daunting problem. Like all major cities in the world, Hong Kong faces a challenge in managing its sustainability and environmental issues: waste management, sewage and water treatment and lack of landfill areas, to name but a few. It is all a part of living in a bustling city that never sleeps.

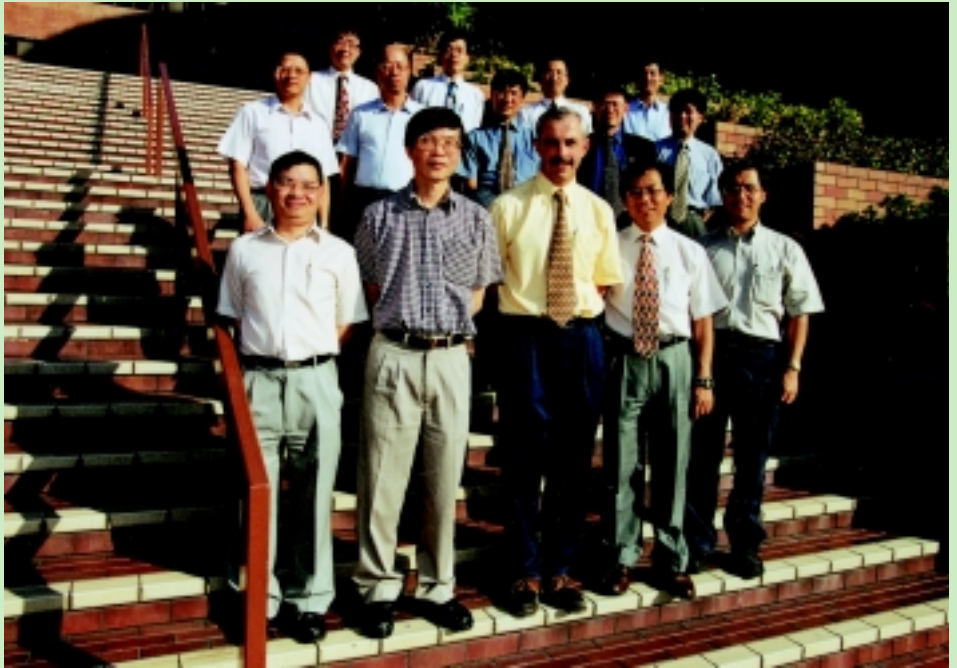
Concern over our environment, especially related to air pollution, has been expressed not only by environmental protection groups, but the Government. Chief Executive Tung Chee-hwa has highlighted again in his recent policy speech the importance of devoting resources to environmental protection. Politicians, non-governmental agencies, businessmen and citizens of Hong Kong are united on a single front, to ensure that Hong Kong's future does not simply lie in becoming a thriving international financial centre, but also a clean and healthy place for all its citizens.

Industrialised countries, such as the US and UK, have long established an environmental protection industry. This industry possesses professionals and academics to develop technologies and management skills in serving business and government sectors in environmental care. Demand for talents in this field is on the rise as global concern for the environment reaches new heights.

The Hong Kong Polytechnic University is at the forefront of this trend in Asia. The University has taken a proactive role in ensuring Hong Kong's future as a sustainable mega-city by establishing the region's first Research Centre for Urban Environmental Technology and Management (RCUETM). The goal of the Centre is to become Asia's hub for environmental research and education.

There are several objectives of the RCUETM. Under the aegis of the Department of Civil and Structural Engineering, the Centre will integrate the department's existing strengths in environmental engineering and management. Academics are one of the few groups who have the valuable opportunities to carry out application-oriented research that can be used by industries to combat environmental damage and pollution. The Centre will also take an interdisciplinary approach, bringing together engineers and other professionals in developing courses for life-long learning and fostering an exchange of information with others around the world.

*The team behind the scene: the RCUETM strong force helps make Hong Kong a better place.*



In July this year **Professor Nigel Graham** was appointed to the post of Chair Professor of Environmental Engineering, and in his position, he will head the RCUETM, comprising a total of 16 staff members. Speaking from his office overlooking the cross-harbour tunnel, Prof. Graham has lofty aspirations to turn the RCUETM into the driving force behind Asia's environmental industry.

"Hong Kong faces the same problems as other big cities, the lack of land means we have to solve our sustainability problem," Prof. Graham said. "The only difference is that we are facing these problems sooner than other places because of our acute shortage of land."

However, Prof. Graham praises Hong Kong's governmental departments for taking sound action. "I have spoken with officials from the Environmental Protection Department and they know the problems and are on the right course."

Having been a professor at London's Imperial College and with extensive experience of environmental problems in many countries, Prof. Graham is brimming with enthusiasm and ideas for the RCUETM. He feels that university centres like this possess the best of both worlds.

"A university is a reservoir of knowledge. We can collaborate with the government and the private sector by carrying out consultancy work for them," said Prof. Graham, who wears the facilitator's hat for new environmental technologies. "Our knowledge, passed through to business and industry, can be put into practice."

The immediate objectives of the RCUETM are to consolidate the University's pool of expertise and to promote interdisciplinary projects. Prof. Graham hopes that this Centre will not only become the region's most comprehensive research facility, but to find its rightful place among the world's best. "I plan to encourage more collaboration and exchange between our researchers and international experts. Though a number of the University's professors are trained abroad from time to time, I hope to see more of that."

Among the varied research interests pursued at the RCUETM are indoor air quality, odour, traffic pollution, waste control technology and management, water quality, and water and wastewater treatment. Staff of the RCUETM run the University's atmospheric







*One of the research projects being undertaken at the Centre. The balloon is ready to be released for ozone analysis.*

research station at the south-eastern tip of Hong Kong which monitors air pollution in eastern Asia, in collaboration with international organisations (including NASA). In recent months grave concern over Hong Kong's air pollution problem has been made clear by the public and private sectors. Air pollution indices have reached an all time high and health officials have warned of potential health risks and problems.

Although Hong Kong faces an acute problem with auto emissions and other forms of outdoor air pollution, indoor air quality is an equally significant area worth attention. The RCUETM has established the Indoor Air Group, engaging in the pursuit of "Healthy Buildings, Healthy People". The team has already conducted several consultancy projects for Cathay Pacific Airways, and various indoor environments (shopping malls, restaurants, schools, offices, residential homes) have also been investigated for air quality.



*The equipment is for analysis of toxic air pollutants.*

**Dr Lee Shun-cheng**, Associate Professor of the Department of Civil and Structural Engineering, stresses the importance of indoor air quality. "Many of us spend most of our days indoors in the office, up to 12 hours for some," Dr Lee said. "Indoor air pollutants can severely affect our health."

Sophisticated equipment, such as the Indoor Air Quality Emission Chamber for sampling and analytical purposes, has enabled the team to successfully carry out the research and consultancy projects. Dr Lee feels that with the set up of the RCUETM, resources can be put together to provide turnkey solutions for corporations and industries.

The work performed by the Indoor Air Group is an example of collaboration between academia and industry that Prof. Graham hopes to promote more. "To solve our problems we need to look at the environment as a whole," he said.

To further encourage this active exchange, PolyU recently organised a regional workshop to discuss one of the most pressing environmental problems facing Hong Kong today. The Better Air Quality: Motor Vehicle Control and Technology Workshop 2000 (BAQ), held in September, was officiated by the Chief Executive Tung Chee-hwa and saw attendees from the Government, industry giants and academics worldwide.

The three-day workshop was divided into nine sessions, with discussions on various pollution subjects including Emissions Control in China, In-use Vehicle Testing Technology, Transport Policy and Planning, and Sharing of Experience – targeted at trade representatives.



The University has recently launched a new feature on its website about environment-related research projects.



The BAQ workshop has enjoyed great success in bringing local and overseas experts to discuss possible solutions for better, cleaner air.



Traffic air sample analysis in the Air Laboratory.



**Dr Hung Wing-tat**, Assistant Professor of the same Department and Chairman of the BAQ, expressed that the success of the workshop was due to the frank and open attitude of all participants. "We had a positive atmosphere because we were all working towards a common goal: to find a solution for the acute problem of air pollution."

Dr Hung also felt that the international panel of participants was essential. In attendance were representatives from the SAR's Environmental Protection Department, the California Air Research Board, Inha University in Korea, the Chinese Academy of Sciences and New York State Department of Environmental Conservation, among others. "We had academics from Beijing, Singapore and New York, and were able to get a lot of information about how other cities are progressing in this respect," he said. "The international dialogue is important; we invited people who are at the forefront of their respective industries."

One of the achievements of the BAQ, according to Dr Hung, was "threading the needle". "All of us can just sit around and talk but by getting together we are pitching our resources to find solutions," Dr Hung said. At the conclusion of the workshop, all participants were given briefing notes on the workshop so they could easily perform follow-up work.

The response was so favourable that Dr Hung thinks there is more in the pipeline. "We are planning to continue hosting the BAQ every two years, and possibly turning it into an important regional event."

According to Dr Hung, the work is never done. "Hong Kong is taking a proactive approach in developing ways to better the environment, but we are still a bit behind the US and the European Union," he said. "We are all in this together."





# CE says ...

- My government fully understands that it is no good having a hugely successful economy if we do not have a commensurate quality of life which includes clear air, fresh water, and a green and healthy living environment.
- Nowadays, a world-class business environment means more than just providing the institutions and physical infrastructure needed for business to flourish in an open and corruption-free system. Nowadays, as much emphasis is being placed on the state of the environment as much as on the state of the economy.
- Controlling vehicle emissions is an important component of the government's comprehensive programme to improve the air quality in Hong Kong. To curtail the two major pollutants in vehicle exhausts, we set a target to reduce nitrogen oxides emissions by 30% by the end of 2005 and to cut particulate emissions by 80% by that time.
- We have begun a programme to replace our 18,000 diesel taxis with those that run on cleaner liquefied petroleum gas. We are encouraging faster replacement by providing a one-off grant of \$40,000 for each diesel taxi that is replaced. There are now 1,400 LPG taxis on the road but we expect a much sharper increase in the coming few months as more LPG filling stations come on line.
- From next week, we begin a programme to retrofit particulate traps on the 42,000 pre-Euro light diesel vehicles in Hong Kong. We will launch a similar retrofitting programme for pre-Euro heavy diesel vehicles after trials to identify catalytic converters best suited to Hong Kong driving conditions.
- In July, Hong Kong became the first city in Asia to introduce ultra-low sulphur diesel. A concessionary duty was levied on the fuel to make it price-competitive with the normal diesel on the market at that time. Within a month all 160 petrol stations were selling this new fuel instead of the older type diesel.
- In order to better co-ordinate inter-departmental efforts to improve air quality, a Task Force chaired by the Secretary for the Environment and Food was established in May. In addition to overseeing the implementation of measures announced in last year's Policy Address, which were many, the Task Force will investigate further practicable measures that can be taken to tackle air pollution problems even more comprehensively.



*Extracted from CE's speech at the BAQ opening ceremony on 18 September.*

# 特首的話:

- 特區政府絕對明白，縱使經濟發展蓬勃，假若沒有相應的優質生活，包括清新的空氣、潔淨的食水與廣植草木的健康生活環境，也是美中不足的。
- 今天，只有公開而廉潔的體制，單為商人制定所需的各項制度和提供所需的基本設施，讓他們大展拳腳，並不足以建立達致世界水平的營商環境。今天，生活環境與經濟狀況同樣備受重視。
- 特區政府已制定全面計劃，以改善本港空氣質素，而控制汽車所排放的廢氣是當中的一環重要工作。為減少汽車廢氣中兩種主要污染物，我們已定下目標，在二零零五年年底前，把氮氧化物的排放量減少百分之三十，而粒子的排放量則減少百分之八十。
- 我們已推展一項計劃，以造成較少污染的石油氣的士取代本港一萬八千輛柴油的士。為加快計劃進度，每輛經取代的柴油的士車主可獲發一筆過四萬元資助。香港現時已有一千四百輛石油氣的士在路面上行走，但預計在未來數月，當更多石油氣加油站投入服務後，這個數字會大幅度增加。
- 由下星期開始，我們會推展一項新計劃，鼓勵本港四萬二千輛在歐盟標準生效前製造的輕型柴油車輛車主為其車輛安裝微粒過濾器。我們先進行一連串試驗，以確定哪些催化器最適合車輛在香港路面行駛的情況，然後便會向在歐盟標準生效前製造的重型柴油車輛推行類似計劃。
- 香港在七月成為亞洲區內率先引入超低硫柴油的城市，令人至感高興。我們給予這類燃油訂定優惠稅率，使這類燃油的價格較市場上一般汽車柴油的價格更具競爭力。稅務優惠措施推行一個月後，全港一百六十個汽車加油站便已全面響應，推出超低硫柴油，用以取代柴油車原用的汽車柴油。
- 為了更有效地協調政府部門之間改善本港空氣質素的工作，我們在五月成立了一個專責小組，由環境食物局局長擔任主席。除了監察各部門推行我在去年《施政報告》中公布的多項改善環境措施外，專責小組也會深入探討空氣污染問題，研究還可採取哪些切實可行的措施，以便更有效地解決這問題。

*《節錄自行政長官在九月十八日「清新空氣：汽車控制及未來科技研討會」開幕典禮上的致辭》*

## 建設未來 注重環保

**在**大約一千一百平方公里的彈丸之地，住了超過六百八十萬人，香港的人口稠密程度於世界排名可說數一數二。像許多世界各地的大城市一樣，香港面對一連串有關持續發展及環保的問題：廢物處理、污水處理、缺乏堆填區等等，全都跟一個繁榮的不夜城有著不可分割的關係。

在關注環境方面(特別是空氣污染)，不但環境保護團體表達了意見，政府也申明了立場。行政長官董建華先生於今年的施政報告內再次提出為保護環境撥備資源的重要性。政客、非官方機構、各行各業和市民意見一致，使香港不單著眼成為一個經濟蓬勃的國際金融中心，而且為居民提供一個清潔、美好的環境安居樂業。

在亞洲境內，香港理工大學在環保方面處於領先的位置。理大在確保香港成為能持續發展的大城市方面擔當主動的角色，成立了城市環境科技及管理研究中心，目標是奠定於亞洲區內在環境研究與教育上翹楚的地位。

中心設於大學的土木及結構工程系之內，旨在把部門內現有環境工程及管理的優勢集中起來。事實上，學界往往具備難得的機會從事以實用為本的科研活動，以助各界減低環境污染及所造成的傷害。中心也會成為工程師、專業人士匯聚之地，讓來自各地的專家互相交流意見。

本年七月，關禮文教授獲委任主管整個中心的運作。中心職員共十六人，關教授對它發展成為亞洲區內環境工業的先驅滿有把握。「香港面對的難題跟其他大城市無異，土地不足促使我們要解決持續發展的問題。唯一的分別是香港比其他地方較早遇上這些問題，只因土地實在缺乏。」

關教授曾在倫敦皇家學院任教授一職，對不同國家的環境保護問題有豐富的經驗。他認為這類設於大學的中心具備雙重的優點。「大學好比一所知識的寶庫。我們可透過提供顧問服務與政府及私人機構合作。我校的知識傳達至工商界，可獲應用於實際的環境。」

目前該中心的要務為集合大學所有有關的專才、資源，發展多元化的項目。關教授希望中心能在世界排名佔一席位。「我計劃安排中心的科研人員與世界各地的科研人員多作交流，互相合作；雖然我校的一些講師不時在海外接受培訓，但我希望日後有更多這種機會。」

中心進行的科研項目可分為六大範疇：室內空氣素質、氣味評估及控制、交通導致的污染、廢物控制科技及管理、淨水素質，以及淨水及污水處理。

雖然本港存在由汽車排放廢氣以及其他原因造成的室外空氣污染問題，但是室內空氣也同樣值得留意。中心設立了室內空氣組，進行「樓房健康、人們健康」的研究，並為國泰航空公司及很多購物商場、辦公室進行顧問工作。

同一學系的副教授李順誠博士強調室內空氣素質的重要性：「很多人每天花很長時間在辦公室內，有些達十二小時之久；室內空氣的污染物可對人體構成嚴重的損害。」

研究人員能成功推行顧問項目，有賴先進的儀器抽取樣本及加以分析，例如室內空氣素質排放模擬測試室。李博士認為中心能把資源齊集，為工商機構提供有效的解決方案。

在加強意見交流方面，理大於九月份舉辦了一個地區性「清新空氣：汽車控制與科技研討會 2000」，由行政長官董建華先生主禮，與會人士包括世界各地政府官員、工商界翹楚以及學界代表。

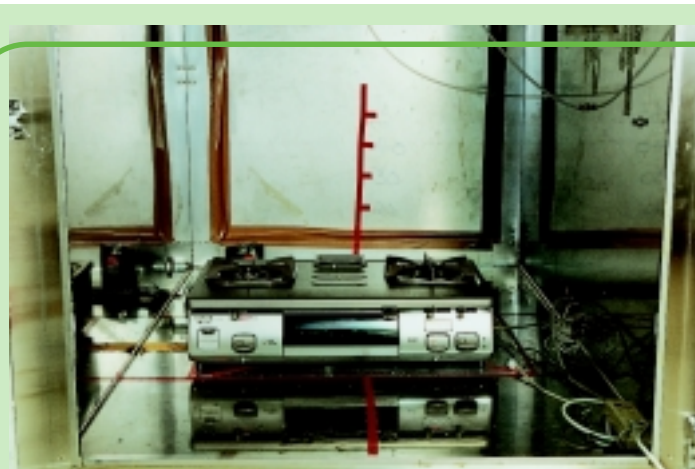
為期三天的研討會探討與污染有關的不同課題，例如中國在控制汽車排放的經驗、在用車輛測試技術、運輸政策及規劃以及業界分享控制汽車排放的經驗。

助理教授熊永達博士為研討會的主席，他表示是項活動非常成功，因為與會者均抱著坦率開放的態度。「會上的氣氛熱烈積極，場內所有人都有一個共同目標，就是為日趨嚴重的空氣污染問題找出解決方法。」

熊博士認為參加者的背景也很重要，他們來自不同的機構。「來自北京、新加坡、紐約等學者聚首一堂，讓我們得知當地在控制空氣污染方面的進展。在國際水平的交流是很重要的，獲邀的代表都在其行業有一定的地位。」

研討會發揮的其中一項功用，在於「穿針引線」。熊博士稱：「這個活動讓多位專家一起動腦筋想辦法，而不是只顧各自空談。」會議結束後，各與會者都獲討論摘要，以便跟進。

由於反應極佳，熊博士表示這個研討會或會每兩年舉辦一次，作為亞洲區內一項大事。不過，工作不會就此停下來。熊博士補充：「香港正積極推行各種方法以改善環境，但與歐、美相比仍有一段距離。港人必須同心協力，以取得更大進展。」



設於中心內的室內空氣素質排放模擬測試室