室內空氣質素講座
Indoor Air Quality Talks

自「室內空氣質素檢定計劃」於2003年9月18日推出後，機電工程署分別於2003年9月23日、9月30日和10月8日為各有關人士(包括專業人士、大廈管理公司、室內空氣質素顧問和實驗所)舉行了三次有關測量室內空氣質素的講座，藉此和參加者分享我們進行室內空氣質素測量的經驗，包括採用的方法和設備、可能遇到的問題及解決方法。

After the launch of our Indoor Air Quality (IAQ) Certification Scheme on 18 September 2003, we delivered three talks on IAQ to different stakeholders, including professionals, building management companies, IAQ consultants and laboratories. In these talks, we shared the experiences gained from our IAQ surveys, varying methodologies, the different equipment used, and possible problems and solutions with participants. The talks were held on 23 and 30 September, and 8 October 2003.

智能問與答 Q&A

1 哪一類冷卻塔需要較多補充水，淡水冷卻塔抑或海水冷卻塔？

由於海水的溶解固體含量較高，故海水冷卻塔需要較多補充水，方可保持良好的水質(透過定期排走沉澱物的程序)。淡水冷卻塔需要的補充水量約為循環水流量的1.8%，而海水冷卻塔所需的補充水量則是淡水冷卻塔的2倍左右。

1 Which type of cooling tower requires a higher water make-up rate – a fresh-water cooling tower or seawater cooling tower?

Due to the much higher rate of dissolved solid content, a seawater cooling tower requires a higher water make-up rate to maintain water quality (through regular blow-downs). The water make-up rate of a fresh-water cooling tower is about 1.8% of the water drculation rate, while the rate for a seawater cooling tower is about double this figure.

2 以下哪種空調系統改裝方法可節省最多能源？

A 把氣冷式冷凍機的氣冷式冷凝器改為蒸發式冷凝器。

B 把整個氣冷式冷凍機組改為水冷式冷凍機及冷卻塔。

C 在氣冷式冷凍機的氣冷式冷凝器加裝灑水設施。

第B種改裝方法可節省最多能源。採用第A種或第C種方法亦可節省能源，不過或多或少會受到製冷系統原有設計的限制。

2 Which of the following air-conditioning system retrofits can achieve the highest efficiency gains?

A An air-cooled chiller with the air-cooled condenser replaced by an evaporative condenser.

B An air-cooled chiller with the whole air-cooled chiller unit replaced by a water-cooled chiller and cooling tower.

C An air-cooled chiller with a water-spraying facility added to the air-cooled condenser.

Retrofit B is able to achieve the highest efficiency gains. Even though the efficiency gains for retrofit A or retrofit C are appreciable, the systems are constrained by the original design of their refrigeration cycles.

3 熱泵性能系數的定義是什麼？

對於以電力驅動的熱泵而言，性能系數指熱輸出和電輸入的比率，以無單位的數字表示。熱泵把熱力從「來源點」「移」到「接收點」，這些來源點和接收點可以是空氣或水。熱泵內壓縮機所耗用的電力會轉化為冷凍劑的內能，然後以熱力的形式被送到「接收點」。若不計算機組損耗，性能系數相等於(從來源抽取的熱力+電輸入)/(電輸入)，所得數值會大於1。

在最佳工作狀態下，熱泵的性能系數一般可達3至8。在實際應用時，因來源側和接收側的水溫(或空氣溫度)不斷變化，故性能系數的年平均數值會低於最優化數值。

3 What is the definition for the term coefficient-of-performance (COP) in relation to a heat pump?

COP, in relation to an electrically-driven heat pump, is the ratio of the thermal output and the electricity input, resulting in a dimensionless number. A heat pump "moves" heat from the "source" to the "sink", which can be in the form of either air or water. The electricity used to drive the compressor of the heat pump is transformed into internal energy of the refrigerant, and dumped in the "sink" as heat energy. Ignoring losses, COP is equal to (heat extraction from source + electricity input) / (electricity input), which is always greater than one.

Heat pumps can typically achieve COPs of between 3 to 8 under their most favourable working conditions. In actual applications, because of the varying source-side and sink-side entry temperatures of the water (or air), the annual average COP is lower than its optimum conditions.

聯絡資料 Contact

任何人士如欲就本通訊提出意見或詢問，請與我們聯絡，資料如下：
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機電工程署 EMSD

能源效益及相關事項通訊 A Newsletter on Energy Efficiency and Related Matters

EnergyWits 智能

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機電工程署 EMSD

焦點題目 Focus Topic

香港的水冷式空調系統
Water-cooled Air-conditioning Systems in Hong Kong

引言 Introduction

香港是一個地處亞熱帶地區的世界級商業城市，空調用電量佔總用電量的一大部份。在 2001 年，空調用電量佔總用電量的 32%，當中七成用於非住宅建築物。和 1991 年相比，2001 年的總用電量增加了 47%，而空調用電量亦有相約的增長，由 29,070 太焦耳增至 43,093 太焦耳。隨著人口和經濟活動不斷增加，空調用電量會不斷上升，實有必要提高空調方面的能源效益，以壓抑電力需求的增長，並減少由發電廠排出的溫室氣體，從而達到保護環境的目的。

機電工程署在 1999 年進行了一項研究，名為「在香港推廣水冷式空調系統的初步顧問研究」。研究顯示，若把氣冷式空調系統改為水冷式空調系統，可節省可觀的電力，不單在技術上可行，而且符合環保原則。在進行初步研究後，本署在 2000 年開展了三項詳細的顧問研究及一個冷卻塔先行性計劃。研究的目的是要探討廣泛使用水冷式空調系統的細節問題，例如技術、環境、合約策略、監管架構、土地等問題，下文會介紹這些研究及先行性計劃的最新進展。

In Hong Kong, with its sub-tropical climate and role as one of the world's leading commercial cities, the use of air conditioning accounts for a large proportion of our total electricity consumption. In 2001, air conditioning accounted for 32% of Hong Kong's total electricity consumption, with 70% of this amount being taken up by commercial and industrial buildings. Comparing annual 2001 statistics with 1991, our total electricity consumption grew by 47% while electricity consumption for air conditioning rose similarly, from 29,070 TJ (terajoules) to 43,093 TJ. As our population and economic activities increase, the use of air conditioning will continue to grow. We therefore need to take measures to improve our energy efficiency in this area, not only reducing our energy demands but also minimising the emission of greenhouse gases from our power generation plants, to protect our environment.

The "Preliminary Study on the Wider Use of Water-cooled Air Conditioning Systems in Hong Kong" conducted in 1999 by EMSD, identified that switching from Air-cooled Air-conditioning Systems (AACS) to Water-cooled Air-conditioning Systems (WACS) would achieve marked savings in energy use. Furthermore, the move was seen as both technically feasible and environmentally acceptable. Following the Preliminary Study, we conducted three further consultancy studies and launched a pilot scheme in 2000. The Study looked into detailed aspects of WACS in Hong Kong and its implementation, such as its technical and environmental requirements, contract strategies, Hong Kong's regulatory framework, land issues, etc. This article covers the project's latest developments and activities.

進度 Project Progress

全港性採用水冷式空調系統研究
Study on Territory-wide Implementation of Water-cooled Air Conditioning Systems in Hong Kong

本署委託顧問公司進行的「全港性採用水冷式空調系統研究」已於 2003 年年中完成。研究結果的摘要已上載至機電工程署的網頁 http://www.emsd.gov.hk/emsd/e_download/wnew/wacs_tws_es_r.pdf 。

其要點如下：

- 估計至 2020 年非住宅空調設備的總製冷負荷會達到 13,348,500 千瓦。
- 若把氣冷式空調系統改為水冷式空調系統，即區域性供冷系統、集中式海水冷凝器製冷系統和蒸發式冷卻塔製冷系統，每年的空調用電量可分別節省 35%、28% 或 20%。
- 把本港劃分為 50 個區，並確定當中 20 個是有條件採用區域性供冷系統的。

政府在 2003 年 8 月至 11 月就研究的結果和建議進行公眾諮詢，我們現正審閱收集所得的意見，以制定本港實施水冷式空調系統的策略。

In mid-2003, the consultancy study "Territory-wide Implementation Study of Water-cooled Air Conditioning Systems in Hong Kong" was completed. The Executive Summary of the Study is available on EMSD's website at: http://www.emsd.gov.hk/emsd/e_download/wnew/wacs_tws_es_r.pdf.

Key findings include:-

- The projected total air conditioning load (cooling load) for non-domestic premises in the entire territory is estimated to reach 13,348,500 kW by 2020;
- Switching from Air-cooled Air Conditioning Systems (AACS) to Water-cooled Air-conditioning Systems (WACS) – District Cooling Systems (DCS), Central Seawater Schemes, or Cooling Tower Schemes, would make it possible to achieve annual air conditioning end-use electricity savings of up to 35%, 28% and 20% respectively;
- Dividing the territory into 50 zones, 20 of them have been identified as potential DCS zones.

A public consultation exercise on the Study's findings and recommendations was conducted from August to November 2003. We are now reviewing the comments received as we formulate an implementation framework for water-cooled air-conditioning systems in Hong Kong.

東南九龍發展區採用區域性供冷系統研究
Study on the Implementation of a District Cooling System at South East Kowloon Development

顧問公司已在 2003 年 9 月底完成「東南九龍發展區採用區域性供冷系統研究」。區域性供冷系統是水冷式空調系統的一種，透過地下輸水管，由中央冷凍水機組為區內的建築物提供制冷。研究認為區域性供冷系統符合環保原則，可節省高達 35% 的能源及平均 70% 的機房空間。研究又指這項計劃是可行的，且比個別建築物獨立設置空調系統更為可靠。

至於如何在東南九龍發展區提供區域性供冷服務，研究認為最合適的做法，是以「建造—營運—移交」的模式，與私營機構定下 30 年合約，由他們負責提供服務。不過，財務分析顯示興建區域性供冷系統須投入大量資金，故有一定風險，因此有必要推出鼓勵措施，例如在土地用途方面的安排，令這項計劃更具商業吸引力。

研究結果摘要已上載至機電工程署網頁，供公眾閱覽，網址為：http://www.emsd.gov.hk/emsd/chi/pee/wacs_pub.shtml 。2003 年 2 月進行的公眾諮詢顯示，這項計劃大致獲得市民的支持。

實施這項計劃的時間表須與東南九龍發展區本身的發展時間表配合。

The "Implementation Study of a District Cooling System (DCS) at South East Kowloon Development" was completed by the consultants in September 2003. DCS is a form of water-cooled air-conditioning system for which centralised chiller plants provide chilled water through underground distribution pipelines to a number of buildings within a district. The Study concluded that DCS is an environmentally-friendly system enabling energy savings of up to 35%, with space savings of 70% in plant rooms on average. The system is seen as feasible and far more reliable than installing individual air-conditioning systems in the different buildings.

A "build-operate-transfer" business model to be undertaken by the private sector with a 30-year contract period, has been recommended as the most suitable approach for providing the DCS service at South East Kowloon Development. However, as financial analysis indicates that DCS construction is capital-intensive and as there is some risk associated with the business, incentives such as land use arrangements have been recommended to improve the project's overall business viability.

The Executive Summary of the Study is available on our website for public view at: http://www.emsd.gov.hk/emsd/eng/pee/wacs_pub.shtml. In the public consultation exercise carried out in February 2003, general indications show that the stakeholders do support the initiative.

However, the DCS implementation programme at South East Kowloon Development will need to follow the overall development of the area itself.

DCS in Chicago
芝加哥的區域供冷系統

灣仔和銅鑼灣區採用水冷式空調系統研究
Study on the Implementation of Water-Cooled Air Conditioning Systems in Wan Chai and Causeway Bay

這項研究於 2001 年 12 月展開，目的是探討在灣仔及銅鑼灣實施集中式海水冷卻系統或區域性供冷系統的可行性。灣仔及銅鑼灣區是發展成熟的商住混合區域，與新發展區截然不同，故須深入研究相關的技術、交通、環境、土地等複雜問題。這項研究將於 2004 年年初完成，屆時亦會就實施方法及架構提出建議。

MinatoMirai21 - DCS in Yokohama
橫濱的區域供冷系統

This Study commenced in December 2001, to examine the possibility of implementing Central Seawater-cooled Systems or District Cooling Systems in Wan Chai and Causeway Bay. The Wan Chai and Causeway Bay area, a built-up area with both residential and commercial buildings, is very different from a new district. The Study therefore examines the many complex issues involved, such as technical requirements, traffic conditions, environmental and land issues. Also recommending a relevant framework and suitable implementation approach, the Study will be completed in early 2004.

機電工程署 EMSD

節能空調系統的蒸發式冷卻塔
廣泛使用淡水先行性計劃

Pilot Scheme for Wider Use of Fresh Water
in Evaporative Cooling Towers for
Energy-efficient Air-conditioning Systems

這項計劃於2000年6月推出，於六個指定地區進行，其後，指定地區的數目增加至54個，好讓更多非住宅樓宇能使用水冷式空調系統。

截至2003年12月為止，我們收到的申請數目達65宗，涉及的非住宅樓面面積共2,166,000平方米。估計這些使用蒸發式冷卻塔的水冷式空調系統落成後，每年可節省2,600萬度電。

上述54個指定地區包括港島和離島13個地區、九龍19個地區、新界東12個地區和新界西10個地區。有關該計劃的小冊子和各地區的位置圖可在機電工程署的網址下載：http://www.emsd.gov.hk/emsd/chi/pee/wacs.shtml.

截至2003年12月初為止，已有七個使用蒸發式冷卻塔的水冷式空調裝置落成，並投入運作。詳情請參閱附表。

This Scheme was first launched in June 2000, covering six designated areas. It was subsequently expanded to cover a total of 54 designated areas so that more non-domestic buildings would be allowed to use fresh water in the evaporative cooling towers of their air-conditioning systems.

As at December 2003, the number of applications received for the use of these systems had grown to a total of 65, involving 2,166,000 m^2 of non-domestic floor area in total. It is estimated that 26 million kWh of electricity will be saved annually upon the completion of these water-cooled air-conditioning systems.

The 54 designated areas consist of 13 areas on Hong Kong Island and the Outlying Islands, 19 in Kowloon, 12 in the New Territories East, and 10 in New Territories West. Details of the Pilot Scheme, a brochure and the location plans for these areas can be downloaded from EMSD's website at: http://www.emsd.gov.hk/emsd/eng/pee/wacs.shtml.

Seven water-cooled air-conditioning installations using evaporative cooling towers registered under the Pilot Scheme have been completed so far and are now in operation. Details are given in the accompanying table.

大有商業大廈		Tai Yau Building	
樓面面積	23,683 平方米	Floor Area	23,683 m^2
投入運作日期	2001 年 12 月	Commissioning Date	December 2001
冷卻塔冷卻量	3 x 2,000 千瓦 + 1 x 1,480 千瓦	Cooling Tower Capacity	3 x 2,000 kW + 1 x 1,480 kW
用水量	每日 36 立方米	Estimated Water Consumption	36 m^3/day
估計省電量	每年 1,079,251 度電	Estimated Electricity Saving	1,079,251 kWh per annum

大業商業大廈		Tai Yip Building	
樓面面積	6,732 平方米	Floor Area	6,732 m^2
投入運作日期	2002 年 9 月	Commissioning Date	September 2002
冷卻塔冷卻量	2 x 989 千瓦	Cooling Tower Capacity	2 x 989 kW
用水量	每日 5.5 立方米	Estimated Water Consumption	5.5 m^3/day
估計省電量	每年 80,784 度電	Estimated Electricity Saving	80,784 kWh per annum

數碼港發展項目		Cyberport Development	
樓面面積	26,483 平方米 (第 1 階段)	Floor Area	26,483 m^2 (Stage 1)
投入運作日期	2002 年 7 月 (第 1 階段)	Commissioning Date	July 2002 (Stage 1)
冷卻塔冷卻量	4 x 1,760 千瓦	Cooling Tower Capacity	4 x 1,760 kW
用水量	每日 131 立方米	Estimated Water Consumption	131 m^3/day
估計省電量	每年 317,796 度電	Estimated Electricity Saving	317,796 kWh per annum

又一城		Festival Walk	
樓面面積	150,000 平方米	Floor Area	150,000 m^2
投入運作日期	2003 年 8 月	Commissioning Date	August 2003
冷卻塔冷卻量	12 x 2,285 千瓦	Cooling Tower Capacity	12 x 2,285 kW
用水量	每日 387 立方米	Estimated Water Consumption	387 m^3/day
估計省電量	每年 4,866,000 度電	Estimated Electricity Saving	4,866,000 kWh per annum

旺角一幢商業大廈		A Commercial Building in Mong Kok	
樓面面積	9,194 平方米	Floor Area	9,194 m^2
投入運作日期	2001 年 9 月	Commissioning Date	September 2001
冷卻塔冷卻量	3 x 1,300 千瓦	Cooling Tower Capacity	3 x 1,300 kW
用水量	每日 16 立方米	Estimated Water Consumption	16 m^3/day
估計省電量	每年 110,328 度電	Estimated Electricity Saving	110,328 kWh per annum

旺角一間食肆		A Restaurant in Mong Kok	
樓面面積	1,300 平方米	Floor Area	1,300 m^2
投入運作日期	2002 年 1 月	Commissioning Date	January 2002
冷卻塔冷卻量	1 x 683 千瓦	Cooling Tower Capacity	1 x 683 kW
用水量	每日 10 立方米	Estimated Water Consumption	10 m^3/day
估計省電量	每年 15,600 度電	Estimated Electricity Saving	15,600 kWh per annum

香港中華煤氣有限公司大樓		Hong Kong and China Gas Company Building	
樓面面積	38,000 平方米	Floor Area	38,000 m^2
投入運作日期	2003 年 6 月	Commissioning Date	June 2003
冷卻塔冷卻量	1 x 3,404 千瓦	Cooling Tower Capacity	1 x 3,404 kW
用水量	每日 22 立方米	Estimated Water Consumption	22 m^3 / day
估計省電量	每年 1,640,287 兆焦耳 (煤氣)	Estimated Energy Saving (Towngas)	1,640,287 MJ per annum

有關水冷式空調系統的宣傳 WACS Publicity

在「亞太會議2003－建造環境」中發表的演說
Presentation at Asia Pacific Conference 2003 on Built Environment

「亞太會議2003－建造環境」在2003年11月18至19日於九龍香格里拉酒店舉行，會議由美國暖氣、製冷及空氣調節工程師協會、香港工程師學會、英國屋宇設備工程師學會、香港理工大學和機電工程署合辦。本署能源效益事務處的同事林明雄先生發表了一份題為「水冷式空調系統：減低大都會熱島效應的方法」的文章，解釋了「熱島效應」的成因及其對香港的影響，以及為何水冷式空調系統有助紓緩此問題。

The Asia Pacific Conference 2003 on Built Environment was held on 18-19 November 2003 at the Kowloon Shangri-la Hotel. The conference was jointly organised by ASHRAE, HKIE, CIBSE, HKPU and EMSD. Mr. Carl LAM from our Energy Efficiency Office presented a paper entitled "Water-cooled Air Conditioning: A Means to Mitigate Heat Island Effects in Metropolitan Cities". In his presentation, he touched on the causes of the "Heat Island Effect" and its implications in Hong Kong, and how water-cooled air-conditioning can contribute to mitigating the problem.

討論小組的主席朱德榮先生向林明雄先生致送紀念品
The discussion panel chairman, Mr. Vincent CHU, presenting a souvenir to Mr. Carl LAM

有關香港水冷式空調系統的講座
Technical Talk on Water-cooled Air-conditioning in Hong Kong

孫強華先生向譚力新先生致送紀念品
Mr. Thomas SOON presenting a souvenir to Mr. L.S. TAM

在2003年9月30日晚上，本署同事譚力新先生在香港工程師學會總部發表題為「香港可否廣泛採用水冷式空調系統」的演說。該講座由香港工程師學會主辦，有超過70人出席。

在講座上，譚先生介紹了三種水冷式空調系統(即冷卻塔系統、區域性供冷系統和集中式海水系統)、這些系統現時在香港的應用情況，以及各系統的優劣，並向與會者介紹全港性採用水冷式空調系統研究結果和推廣使用蒸發式冷卻塔的先行性計劃。

Another EMSD colleague, Mr. L.S. TAM, delivered a talk on "The Potential of the Wider Use of Water-cooled Air-conditioning in Hong Kong" on 30 September 2003 at HKIE's Headquarters. Organised by the Hong Kong Institution of Engineers, the talk attracted over 70 participants.

In his talk, Mr. TAM detailed the three types of WACS systems (cooling tower systems, district cooling systems and centralised seawater systems), their current applications in Hong Kong and their benefits compared to individual systems. He also briefed the audience on the findings of the Study on the territory-wide implementation of WACS and the pilot scheme to promote the wider use of evaporative cooling towers.

機電工程署 EMSD

活動快訊 Events

香港建築物能源效益註冊計劃 五周年交流研討會

Hong Kong Energy Efficiency Registration Scheme for Buildings Experience Sharing Seminar

為慶祝「香港建築物能源效益註冊計劃」推出五周年，我們特於2003年11月26日假富豪香港酒店舉行交流研討會。在研討會中，過往五年曾參與該計劃的人士，以及地產界和建造業的專業人士及從業員，就建築物能源效益交換意見和分享經驗。約有250人出席這次研討會。

To mark the fifth anniversary of the Hong Kong Energy Efficiency Registration Scheme for Buildings, an experience sharing seminar was held on 26 November 2003 at the Regal Hongkong Hotel. The Seminar brought together many of the Scheme's participants over the past five years, as well as professionals and practitioners from the property sector and the building industry, to exchange experiences and views on energy efficiency in buildings. About 250 people attended the seminar.

答問環節時各講者回應台下發問
Speakers answering questions from the floor during Q&A session

機電工程署署長黎仕海先生在致開會詞時說：「這項計劃可協助大廈業主和住客節省大量能源，故我們正積極游說更多大廈業主參與這項計劃。」

研討會由助理署長／能源效益黃達平先生主持，演說的題目共有七個，講者包括香港科技園公司、柏誠(亞洲)有限公司、香港中華煤氣有限公司、康業服務有限公司、仲量聯行物業管理有限公司、有利建築、建築署及能源效益事務處的代表。

演講題目包羅萬有，主要介紹由有關機構擁有或管理的建築物(如科學園、中華煤氣有限公司總部大樓及公共衛生檢測中心)所採取的節能措施。能源效益事務處亦介紹了最新的建築物能源效益守則，即在2003年年初推出的「成效為本建築物能源效益守則」。與會者對各個論題極感興趣，在問答環節時均踴躍提問，反應熱烈。

黎署長更藉此機會，向最近獲註冊的建築物母公司頒發註冊證書，合共九張，並頒贈60份紀念品給在1999至2003年按計劃註冊的建築物的管理公司及業主。在研討會結束前，副署長／規管服務何光偉先生感謝各方對建築物能源效益註冊計劃的支持，並希望計劃能繼續順利推行。

本署曾推出多項計劃，以鼓勵電氣器具、屋宇裝備及車輛採用節能設計，而「香港建築物能源效益註冊計劃」正是其中一項。這是一個自願參與的計劃，建築物必須符合最少一份建築物能源效益守則的要求(即有關照明、空調、電力和升降機及自動梯裝置的守則，以及成效為本守則)，方能獲得註冊。這個計劃以發展商、物業管理公司、建築師和工程師為對象，旨在鼓勵他們在興建新建築物及翻新舊建築物時，採用節能設計，自推出以來，深受業界歡迎。

在過去五年，本署向大約160幢建築物頒發約230張證書，這些建築物包括新落成的建築物和已採用節能裝置的現有建築物。註冊名單上的建築物類別越來越多(包括商業、工業、住宅和研究及科技類別)，成績令人鼓舞。估計該計劃至今已為建築物節省8,500萬元能源支出，單在2003年已經節省3,800萬元。

當然，有些建築物雖沒有註冊但也採用了節能設計，不過，取得註冊卻是對大廈業主、設計者和管理隊伍在節能方面所作出努力的一種肯定，並有助提升獲註冊建築物的環保形象和聲譽。

關於上述計劃的詳細資料，可瀏覽以下網頁
http://www.emsd.gov.hk/emsd/chi/pee/ eersb_pub.shtml

黎署長歡迎在坐嘉賓的致辭
DEMS expressing his welcome to guests

Our Director, Mr. S.H. LAI, said in his Opening Address: "The Scheme can help building owners and tenants achieve significant energy savings. We are working hard to persuade more building owners to participate in the Scheme."

Mr. UY Tat-ping, Assistant Director/Energy Efficiency, chaired the seven presentations. The speakers came from the Hong Kong Science and Technology Parks Corporation, Parsons Brinckerhoff (Asia) Limited, the Hong Kong and China Gas (HKCG) Company Limited, Hong Yip Service Company Limited, Jones Lang LaSalle Management Services Limited, Yau Lee Construction Company Limited, the Architectural Services Department, as well as our Energy Efficiency Office.

The presentations covered a variety of topics, touching upon the energy efficiency and conservation measures adopted in various buildings owned or operated by the presenters' organisations such as the Science Park, HKCG's Headquarters Building, as well as the Public Health Laboratory Centre. The Energy Efficiency Office's presentation was about the latest Building Energy Code – the Performance-based Building Energy Code launched in early 2003. The presentations generated great interest among the audience and stimulated intense discussion during the Q&A session.

Mr. LAI also took the opportunity to present nine Registration Certificates to the parent organisations of recently registered buildings, as well as sixty souvenirs to the management agencies and landlords of buildings registered between 1999 and mid-2003. At the end of the Seminar, Mr K.W. HO, Deputy Director/Regulatory Services, delivered the Closing Remarks, applauding the efforts of the many individuals and organisations involved in this milestone event while also ushering in the next phase of the Scheme.

The Hong Kong Energy Efficiency Registration Scheme for Buildings, launched by EMSD, is one of the schemes launched by EMSD to recognise and encourage adoption of energy-efficient designs for electrical appliances, building services installations, and road vehicles. The main condition for registration under this voluntary Registration Scheme is compliance with one or more of Hong Kong's Building Energy Codes, which includes a lighting code, air-conditioning code, electrical code, lift & escalator code as well as a performance-based code. The Scheme, which aims to encourage developers, property management companies, architects and engineers to adopt energy-efficient designs and retrofits in buildings, has been well-received by the trade.

Over the past five years, some 230 certificates have been issued for about 160 buildings, including both new buildings and existing buildings with energy-efficient retrofits. It has been very encouraging to see the great variety of buildings, ranging from the commercial, industrial and residential to the research and technology sectors, on the registration list. The Scheme is estimated to have achieved cumulative savings of about HK$85 million in energy expenditure, with the saving being HK$38 million in 2003 alone.

Of course there are many buildings that have not joined the Scheme but which are extremely energy-efficient. However the Scheme serves to endorse the efforts of building owners, designers and management teams in their efforts to protect the environment. At the same time, registration under the Scheme helps to highlight an environmental-friendly image for the building's owners while also enhancing the building's prestige.

More details of the above Scheme are given in the following webpage:
http://www.emsd.gov.hk/emsd/eng/pee/eersb_pub.shtml

即將舉辦的 安全及有效使用能源研討會

Forthcoming Symposium on the Safe and Efficient Use of Energy

由機電工程署及香港工程師學會合辦的「安全及有效使用能源研討會 — 迎接未來的挑戰」，將於2004年2月26至27日舉行。研討會的資料單張和報名表格可於機電工程署網頁 http://www.emsd.gov.hk/safeff/ 下載。

研討會為決策者、專業工程師、能源管理人、商業機構決策者、學術界和國際專家提供機會，俾能交流有關能源效益和安全的專門知識和意見，以找出應優先處理的問題，並透過安全及有效使用能源，達到可持續發展這個最終目標。

"The Symposium on Safe and Efficient Use of Energy - the Challenges Ahead", jointly organised by EMSD and the Hong Kong Institution of Engineers, will be held on 26 to 27 February 2004. An information leaflet on the symposium as well as registration forms can be downloaded from our EMSD website at: http://www.emsd.gov.hk/safeff/.

The symposium will provide a platform for policy makers, professional engineers, energy managers, business decision-makers, the academic community as well as international experts, to share their expertise and exchange views on energy efficiency and safety. Through the symposium, we aim to identify priority issues and action, to achieve sustainable development through the safe and efficient use of energy.

機電工程署 EMSD

協辦第四屆太陽能車大賽
Supporting the 4th Solar Cart Race

11月23日天朗氣清，由「地球之友」舉辦、機電工程署協辦的「第四屆太陽能車大賽」，在當日順利舉行。是項比賽旨在令市民認識可再生能源及其應用方法。

比賽當日，機電工程署的能源效益事務處和機場及車輛工程部協助維修太陽能車及參與評分。此外，本署聯同「地球之友」在比賽場地設置展覽攤位，推廣能源效益及可再生能源。

廖局長在一輛太陽能車裏
Secretary for the Environment, Transport and Works in a solar cart

機電署的攤位吸引了很多人
EMSD's booth attracted many visitors

Under the fine skies of 23 November, EMSD, one of the supporting organisations, took part in the 4th Solar Cart Race organised by the Friends of the Earth (FoE). The event aims to raise public awareness on renewable energy and its applications.

On the day of the race, our Energy Efficiency Office and Airport Vehicle Engineering Division provided cart repairs and cart troubleshooting support, apart from also participating in the marking process. In conjunction with FoE, we also set up an exhibition booth at the event, promoting energy efficiency and renewable energy.

廖局長參觀本署展覽攤位
Secretary for the Environment, Transport and Works visit EMSD's exhibition booth.

黎署長正駕駛另一輛太陽能車
Our Director riding another solar cart

退伍軍人病症和其他呼吸系統感染及預防方法研討會
Symposium on Legionnaires' Disease and Other Respiratory Infections and Their Prevention

由預防退伍軍人病症委員會主辦，本署能源效益事務處與香港防癆心臟及胸病協會協辦的「退伍軍人病症和其他呼吸系統感染及預防方法研討會」，已於2003年12月12日順利舉行，吸引了逾200名人士參加。

在預防退伍軍人病症委員會主席李紹鴻教授的領導下，是次研討會為本港醫療和工程兩大專業界別提供了一個緊密合作的機會。本署署長黎仕海先生獲邀為研討會致開幕辭，而多位海外及本地的著名工程和醫學專家就與研討會主題相關的重要議題發表了講話。

The Symposium on Legionnaires' Disease and other Respiratory Infections and their Prevention, organised by the Prevention of Legionnaires' Disease Committee (PLDC) and supported by EMSD's Energy Efficiency Office and the Hong Kong Tuberculosis, Chest and Heart Disease Association, was successfully held on 12 December 2003, attracting over 200 participants.

Under the leadership of Prof. S.H. LEE, Chairman of the PLDC, the symposium facilitated collaboration between two different and distinguished professions in Hong Kong - the medical profession and the engineering profession. Our Director, Mr. Roger LAI had the honour of delivering the opening address for the symposium. Then, a number of leading and well-known international and local engineering specialists and medical experts presented valuable speeches on strategic issues relating to theme of the symposium.

研討會參加者眾
The symposium attracted many participants

新聞 News

加強政府的環保管理工作
Enhancing the Government's Green Management Practices

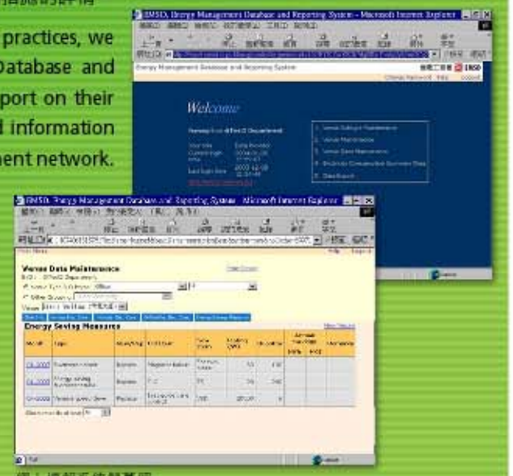
為協助政府加強環保管理工作，機電工程署建立了「能源管理填報系統及資料庫」，政府部門可透過政府內聯網，把其用電量數據和節能措施資料輸入中央資料庫。個別部門可隨時透過該系統讀取其遞交的資料，並監察自己的用電情況。在該系統建立後，本署舉行了六次簡介會，向80個決策局及部門示範該系統的使用方法。各決策局及部門已於11月底完成首輪資料輸入工作。

此外，介紹節能措施的「節能小錦囊」已上載至本署的互動網站「能源資訊園地」(http://www.EnergyLand.emsd.gov.hk)，有興趣的人士可到該網址瀏覽有關措施的詳情。

向局署同事示範如何使用網上填報系統
Demonstrating use of web-based reporting system to colleagues from bureaux/departments

As part of our efforts to enhance the Government's green management practices, we established a web-based reporting system, our Energy Management Database and Reporting System, to make it easier for government departments to report on their electricity consumption and energy saving measures, with the data and information stored in a central database. The System is accessible within the government network. Individual departments can retrieve their own reported data, while also viewing historical electricity consumption trends. After setting up the System, EMSD conducted six demonstration sessions on its use to about 80 bureaux and departments. The first batch of data entries by these bureaux and departments was completed at the end of November.

Additionally, our "Energy Saving Tips" booklet, which provides handy tips on how to save energy, was also uploaded onto our interactive EnergyLand website (http://www.EnergyLand.emsd.gov.hk). Anyone interested can now view its contents on-line.



網上填報系統螢幕照
Screen shots of web-based reporting system

香港能源效益及節能獎(政府機構)
Hong Kong Awards for Energy Efficiency & Conservation in Government

機電工程署最近推出「香港能源效益及節能獎(政府機構)」，是次比賽由2003年10月開始，至2004年9月結束。我們會向節省電力最多的部門和場地，以及採用最佳節能方法的部門頒發獎項。

本署已分別於2003年9月9日和10日舉行兩場簡介會，向各政府部門的代表講解比賽的評審準則，並介紹更多節能方法，參與簡介會的人士逾260人。

We recently launched the "Hong Kong Awards for Energy Efficiency and Conservation in Government". The competition will run from October 2003 to September 2004. Awards will be granted to participating departments and venues that achieve the greatest electricity savings, as well as to departments that have adopted best practices in energy conservation and efficiency.

We also hosted two briefing sessions on 9 and 10 September 2003 to introduce the competition's criteria together with further energy saving advice to representatives of the various government departments. The two sessions registered an attendance of over 260 people.

機電工程署 EMSD

市民對可再生能源研究結果的意見

Results of Public Consultation on the Findings of the Renewable Energy Study

我們已就第一階段「香港使用可再生能源可行性研究」的結果和建議諮詢公眾意見，為期兩個月。諮詢工作已於 2003 年年初完成，共收到 28 份來自環保團體、非政府機構、專業團體及商會的意見書，大部分均認為顧問所提出的可再生能源目標（即 2012 為 1%、2017 為 2% 及 2022 為 3%）太保守。至於其他意見，可歸納為八類，即可再生能源的定義、可再生能源的進口、政府的角色、制度和規管、接駁電網、電力定價、市場問題及技術問題。我們現正檢討第一階段研究的結果，並會詳細考慮市民和相關人士意見。

A two-month public consultation on the findings and recommendations of the Stage 1 Study on the Potential Applications of Renewable Energy in Hong Kong was completed in early 2003. A total of 28 submissions were received from green groups, non-government organisations, professional institutions and trade organisations.. Most respondents considered the renewable energy targets recommended by the consultants (i.e. 1% in 2012, 2% in 2017 and 3% in 2022) to be too conservative. The other opinions collected were grouped into eight broad categories – the definition of renewable energy, the import of renewable energy, the role of the government, institutional and regulatory issues, grid access, power pricing, market issues and technical issues. The findings of the Stage 1 Study are now being reviewed, as we take the opinions expressed by the public and relevant stakeholders into due consideration.

監測太陽能和風能

Monitoring of Solar Energy and Wind Energy

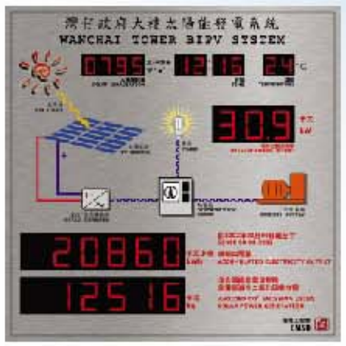
我們於灣仔政府大樓安裝了附設於建築物的光伏裝置，現正由電腦系統監測及記錄各種數據。我們監測的數據包括太陽輻照度、風速、光伏板溫度、輸出功率、累積能量輸出、供電質素等。大樓的正門旁邊已安裝了一塊資料顯示板，向市民發佈即時的操作數據。

位於政府物料營運中心的風力監測站
The wind monitoring station at Government Logistics Centre

香港東部是風力資源最豐富的地方，機電工程署現正於該區的幾個地點進行風力量度計劃，以收集風力數據，評估使用風力發電的潛力。我們已計劃在市區及郊區的選定地點，包括政府物料營運中心、硃甸乍山、伙頭墳洲、廟仔墩及東龍洲設置風力監測站，並正考慮其他有利地點。在大部分地點，我們會在最高離地面 50 米處進行測量；若在建築物的屋頂進行，則監測儀器會在離屋頂最高 10 米處進行測量。有關計劃在 2003 年年底展開，並會於 2005 年年初完成。

The different types of data generated by the building-integrated photovoltaic installation at Wanchai Tower are currently being monitored and logged on a computer system. The data being monitored include solar irradiance, wind speeds, the photovoltaic panel temperature, power output, cumulative energy output, power quality, etc. An information display panel has been installed near the building's main entrance to showcase some of this real-time operational data to the general public.

We are also embarking on a wind measurement programme to measure wind data at a number of sites on the eastern side of Hong Kong, to assess the wind energy potential in the area, which is seen as having the richest source of wind energy in Hong Kong. The installation of wind monitoring stations is being planned at selected locations in both urban and rural areas, including the Government Logistics Centre, Pottinger Peak, Town Island, Miu Tsai Tun and Tung Lung Chau. Other potential sites are also being considered. At most of these sites, measurements will be taken as far up as 50 metres above ground level. On roof-top sites, measurements will be taken up to 10 metres above installation level. The programme started at the end of 2003 and will be completed in early 2005.



灣仔政府大樓光伏板裝置的資料顯示板
Information display panel for Wanchai Tower photovoltaic installation

在赤臘角警署安裝水源熱泵熱水器

Water-to-water Heat Pumps at Chek Lap Kok Police Station

警署內通常會供應淋浴用的熱水。在 2003 年年中，能源效益事務處進行了一項試驗計劃，為赤臘角機場警署安裝兩台水源熱泵熱水器，以取代原有的六個電熱水鍋爐。該種熱水器實際上是以逆轉方式操作的冷凍機，即使「加熱」了的水溫度達攝氏 60 度，新系統的加熱性能系數亦不會低於 2；另外，「冷卻」了的水會用於空調系統，不會浪費。

在 2001 年，六台熱水鍋爐在能源方面耗費逾十二萬元，進行上述更換工程後，估計在熱水和空調系統方面每年可節省約 45,000 元。

The supply of hot water for showers is a standard provision at police stations. In mid-2003, our EEO conducted a pilot project to install two water-to-water heat pumps to replace six electrical hot-water boilers at the Chek Lap Kok Airport Police Station. A heat pump system is in fact a refrigeration unit operating in reverse. Even at a "heated" water temperature of 60 degrees Celsius, a heating COP (coefficient-of-performance) of at least two can be achieved in the installed system. The "cooled" water, at the same time, is not wasted as it is used for space cooling in the air-conditioning system.

In 2001, the energy bill for the six hot-water boilers was over HK$120,000. As a result of this retrofit, an overall annual saving of around HK$45,000 is expected to be achieved, for both the hot-water and air-conditioning systems.

技術演說

Technical Presentations

機電工程署在 2003 年 11 月 3 日至 5 日舉行的「城市環境國際會議」中發表了兩篇文章，分別為「香港應用太陽能試驗計劃」和「香港能源效益及節約能源」。「城市環境國際會議」是一個探討污染問題及都市可持續發展的重要會議，由香港工程師學會主辦，首次會議於 1985 年舉行，其後每三年舉行一次。

我們亦在 2003 年 11 月 11 日至 14 日舉行的「第六屆電力系統控制、操作和管理進展國際會議」發表了一篇題為「香港使用風能」的文章。該會議由香港電機工程師學會主辦，約有 150 名本港和海外人士參加。

EMSD also presented two papers, "Pilot Project on the Application of Solar Energy in Hong Kong", and "Energy Efficiency and Conservation in Hong Kong", at the International Conference on Pollution in the Metropolitan and Urban Environment (POLMET 2003) which was held on 3 to 5 November 2003. POLMET is a triennial event organised by the Hong Kong Institution of Engineers, since 1985. One of the most important conferences in the field, it addresses pollution and sustainability issues in metropolitan cities.

Another paper entitled "Utilisation of Wind Energy in Hong Kong" was presented at the 6th International Conference on Advances in Power System Control, Operation and Management (APSCOM) held on 11 to 14 November 2003. The conference was organised by the Institution of Electrical Engineers Hong Kong, with about 150 local and overseas participants.

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