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

二〇一〇年五月 May 2010

EnergyWits 智能

第十七期 ISSUE NO. 17

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機電工程署
EMSD

良好能效表現建築物 Good Energy Performance Building
國際展貿中心 - 經驗分享
Hongkong International Trade and Exhibition Centre - Experience Sharing

分享經驗

節約能源為現世界各國關注的議題。尤其是像香港這個人煙稠密的城市，商業大廈的能源效益及減少用能更是獲取有效節能的重要因素。毗鄰於九龍灣機電工程署總部的國際展貿中心，是一座樓高十四層的商業大廈，該建築物內包括有零售商店、展覽廳、停車場及寫字樓層等。於2010年5月28日，本署能源效益事務處郭穎妍工程師到訪該中心與他們分享節能經驗。在會面期間，該公司助理總物業及設施經理趙惠敏女士、工程經理黃敏釗先生和有關員工等共同暢談為建築物取得良好能效表現的經驗以及分享他們努力的成果。

良好能效表現

在2010年，國際展貿中心在本署的「香港建築物能源效益註冊計劃」中註冊為良好能效表現建築物。自2009年，國際展貿中心聘請顧問公司進行能源審核，以就各機電設備進行節能評估及找出能效管理機會。該公司管理層有計劃地實施第一、第二和第三類型的「能源管理機會」，重點在加強空調、照明系統、電梯和自動扶手梯的節能效益。

參觀商場的節能設施
Walk through visit to Energy Saving Features

主要實施的「能源管理機會」包括：

- 盡可能在不使用時關閉空調和維持公共地方及商場溫度大約在攝氏25.5度
- 將T8熒光燈管更換為T5熒光燈管或LED燈具
- 安裝水冷式製冷設備，支持廣泛使用淡水於空調系統的蒸發式冷卻塔計劃
- 在送風柜和供水泵系統安裝變頻驅動器

黃先生認為當實施「能源管理機會」時需考慮裝備及裝置的可靠性。可靠性高的裝備及裝置有較長的使用壽命，需較少更換，減少浪費，因此他在採購新產品時會特別謹慎。例如，在推行將T8熒光燈管更換為LED燈具前，先在停車場為LED燈具作一年的可靠性試用，滿意後始作全面更換。

能源管理

趙女士強調:「我們的管理層為租户提供了一個獎勵計劃。如租戶的冷氣用電量較預定為少時，部分冷氣費會在隨後的季度回贈給租戶。」她表示節能目標是建基於公司對建設綠色社區的承擔，他們將繼續支持多種環保措施，以及提供一個綠色的環境給租戶。

推廣使用電動車

為積極建設綠色社區，國際展貿中心主動採取措施推廣使用電動車。該公司在升降機附近提供電動車專用停車位及充電設施，方便使用者上落，並提供數小時免費泊車及免費充電作為鼓勵。該公司之母公司合和實業有限公司更身體力行，已新購入一部三菱i - MiEV電動車作日常交通工具。

Experience Sharing

Energy saving is a widespread issue throughout the world. Especially in a dense city like Hong Kong, energy efficiency and reducing energy consumption in commercial buildings is a key factor in achieving effective energy saving. Hongkong International Trade and Exhibition Centre (HITEC), located adjacent to EMSD Headquarters in Kowloon Bay, is a 14-storey commercial building consisting of retail space, exhibition hall, car park and office floors. On 28 May, 2010, Engineer of EEO, Ir. Wendy Kwok paid an experience sharing visit to HITEC. During the visit, Ms. Susanna Chiu (Assistant Chief Property and Facility Manger), Mr. Alan Wong (Technical Manager) and their staff shared their experience in achieving Good Energy Performance in building and outcome of their efforts.

Good Energy Performance

HITEC was given a good energy performance certificate under our Hong Kong Energy Efficiency Registration Scheme for Building (HKEERSB) in 2010. HITEC has engaged a consultant to conduct an energy audit in 2009. It assessed the energy efficiency performance of various electrical and mechanical installations in HITEC and identify Energy Management Opportunities (EMOs). HITEC management has progressively implemented the Cat I, Cat II and Cat III EMOs, which are mainly for improving system energy efficiency of air conditioning, lighting, lifts and escalators. Key EMOs implemented include:

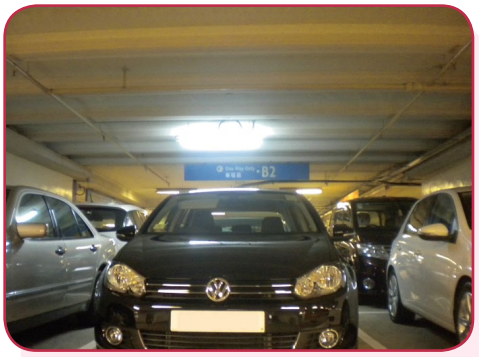
- Turning off air conditioning supply when not in use and maintaining common area of shopping arcade at around 25.5 degrees Celsius.
- Replacement of T8 fluorescent tubes by T5 or LED lights.
- Installation of water-cooled chiller plant, supporting the Scheme for Wider Use of Fresh Water in Cooling Towers for Air Conditioning Systems.
- Installation of variable speed drive for air handling units and plumbing system.

參與廣泛使用淡水於空調系統的蒸發式冷卻塔計劃
Joined the Scheme of Wider Use of Fresh Water in Cooling Towers for Air Conditioning Systems

Mr. Wong mentioned that it is also vital to consider the reliability of equipments and installations when implementing the EMOs. Highly reliable equipments and installations have longer service life, which in turn means fewer replacements and avoid wastage, thus he is cautious in selecting new products. An example is the replacement of T8 fluorescent tube by LED light. He assessed the new LED light in an one-year reliability test in the parking lot before starting the replacement.

Energy Management

Ms. Chiu supplemented "Our management have provided an incentive scheme of air-conditioning supply for tenants. A portion of A/C charge fee will be rebated in the following season if a lower usage of A/C electricity consumption is recorded by their pre-installed energy meters." She shared that their goal for energy saving is based on a strong commitment to building a green community. They will continue to support a wide array of environmental protection initiatives as well as provide a green environment to tenants.



對LED節能光管進行一年可靠性試用
One year reliability test of LED Lighting

電動車專用車位及充電服務
Electric vehicle parking with charging facility

Promote Use of Electric Vehicle

As part of their ongoing efforts in building a green community, HITEC has taken the initiative to promote the use of electric vehicles. HITEC offers a dedicated parking space for electric vehicle which is conveniently located near the lift of the car park. It also offers some hours of free parking and free electric vehicle charging service as incentives to electric vehicle users. Hopewell Holdings Limited, the parent company of HITEC, has purchased a newly arrived Mitsubishi i-MiEV electric vehicle for daily transportation needs.

淡水冷卻塔式的節能水冷式空調系統

Energy Efficient Water-cooled Air-conditioning Systems using Fresh Water Cooling Towers

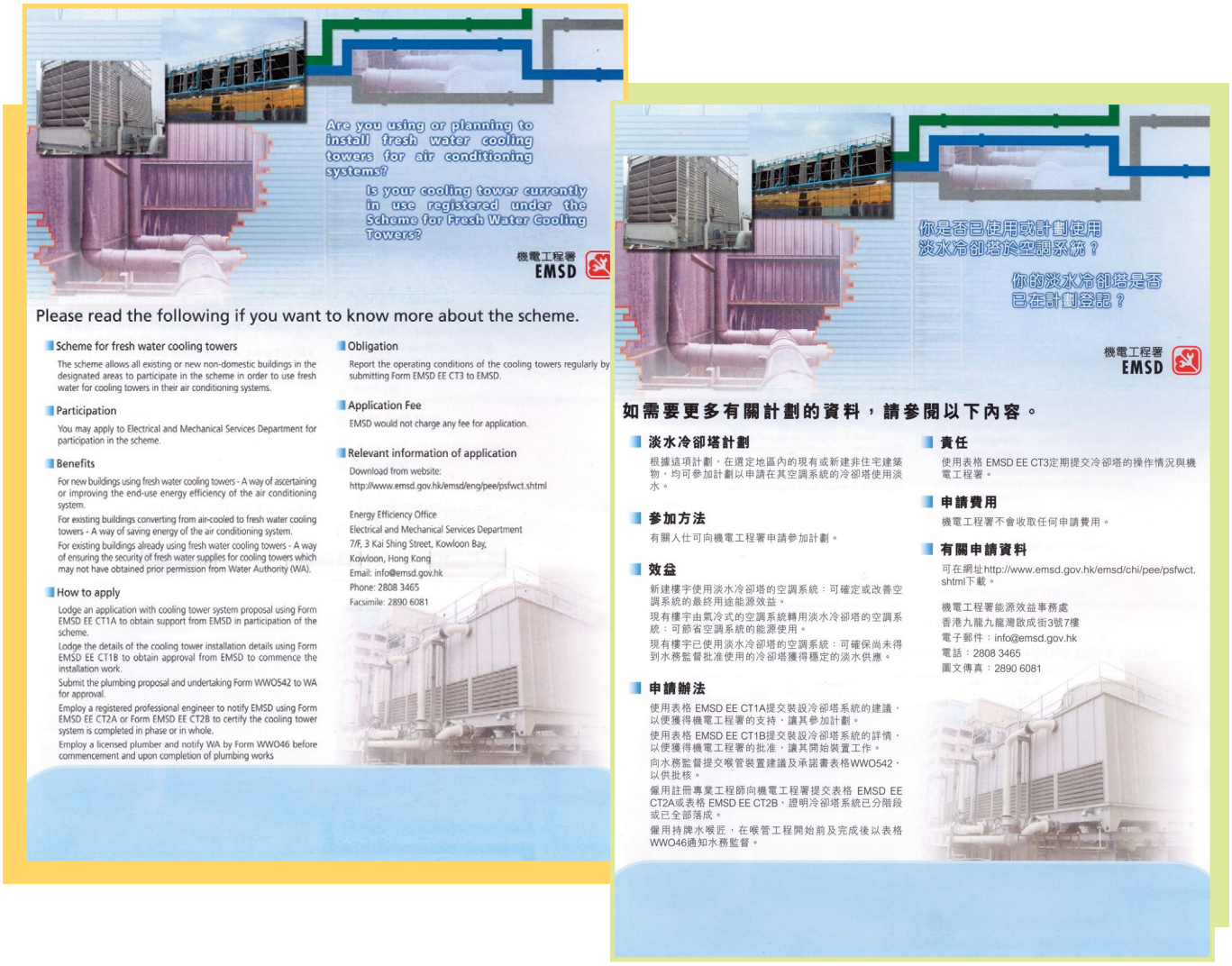
現已知水冷式空調系統較氣冷式空調系統節能，使用者可節省一筆可觀的電費，以降低運作成本。故此，很多新建或現有的商業樓宇的空調系統，越來越普遍改用淡水冷卻塔式的水冷式空調系統。

如果你的空調系統亦用於樓宇的公共地方，請留意政府已於建築物能源效益資助計劃（BEEFS）下，推出了能源效益項目，向住宅、商業、工業建築物的業主立案法團、業主組織或居民組織提供資助，以鼓勵他們進行能源效率項目。我們鼓勵合資格的組織考慮透過BEEFS計劃申請資助進行改善工程，更換現有的氣冷式空氣調節系統，改為水冷式空調系統，以提升能源效率。有關BEEFS資助計劃的詳情，可瀏覽網頁。

It has been known that water-cooled air-conditioning systems (WACS) are more energy efficient than air-cooled air-conditioning systems. Users of WACS can save a noticeable amount of electricity cost, and hence lower operating costs. As a result, it has become more common for new and existing commercial buildings to opt for WACS using evaporative fresh water cooling towers for their air-conditioning systems.

In case your air-conditioning system is also for use of communal areas of the building, you may wish to note that the Government has launched an Energy Efficiency Projects Programme under the Buildings Energy Efficiency Funding Schemes (BEEFS) to provide subsidies to owners' corporations, owners' organizations or residents' organizations of residential, commercial and industrial buildings to encourage them to carry out energy efficiency projects. Eligible organizations are encouraged to consider to convert its existing air-cooled air-conditioning system, if any, to WACS for better energy efficiency through funding applications under the BEEFS for the improvement works. Further information about the BEEFS may be found at the web site.

http://www.building-energy-funds.gov.hk



在獲得水冷式空調系統好處的同時，淡水冷卻塔擁有者須透過妥善設計、安裝、操作及維修冷卻塔，以保障樓宇使用者及公眾人士的健康。為此，機電工程署制定了一套「水冷式空調系統實務守則」(2006年版)，為冷卻塔在設計、安裝、試驗、竣工投用、操作及維修上提供指引。此實務守可參閱網頁http://www.emsd.gov.hk。冷卻塔擁有者亦需符合在「預防退伍軍人病症工作守則」內列出的有關要求，及要時刻保持冷卻塔水質處理程序有效地運作，並最少每半年一次為冷卻塔進行定期清洗及消毒。

While reaping the benefits of WACS, the owners of fresh water cooling towers should also protect the health of the building occupants and the public by proper design, installation, operation and maintenance of their cooling towers. In this connection, EMSD has published a set of Code of Practice for Water-cooled Air Conditioning Systems (CoP for WACS) in 2006 which provides guidelines for the design, installation, testing, commissioning, operation and maintenance of cooling towers. The CoP for WACS may be accessed at EMSD web site http://www.emsd.gov.hk. The owners of cooling towers should also comply with the requirements in the "Code of Practice for Prevention of Legionnaires' Disease" and maintain the water treatment programme effective for the cooling towers, including cleansing and disinfection at least every half-year.

車隊管理的燃料效益
Fuel Efficiency in Vehicle Fleet Management

運輸界別的能源消耗量佔香港能源最終用途總量約35%。提高車隊的燃料效益可降低二氧化碳的排放量及在運作上的燃料成本。因此，機電工程署編製了一本小冊子，旨在簡介和建議如何提高車隊的燃料效益。

小冊子內容包括多種影響燃料效益的因素，如燃料管理、委任燃料經理、燃料審核、車輛規格、車隊經理的角色、駕駛者的角色、車輛每日例行檢查、慳油駕駛模式、載貨的策略、車輛維修及資訊科技和電子裝置等。有關詳情，請向機電工程署索取有關小冊子或於機電工程署網頁下載，網址為http://www.emsd.gov.hk。

The energy consumption in transport sector is about 35% of the total Hong Kong energy end-use consumption. Improved fuel efficiency in vehicle fleet can reduce the emission of carbon dioxide as well as operational fuel cost. As such, Electrical and Mechanical Services Department (EMSD) has published a leaflet which provides brief information and suggestions to improve the fuel efficiency of vehicle fleet.

The content of the leaflet includes various factors affecting fuel efficiency such as fuel management, appointment of fuel manager, fuel audit, vehicle specification, role of fleet manager, role of driver, vehicle daily check, fuel efficiency driving style, strategic load decision, vehicle maintenance, information technology and electronic device and etc. For details, please obtain the leaflet from EMSD or download the leaflet at EMSD internet website at http://www.emsd.gov.hk.

「全方位節約能源」講座
Energy Efficiency and Conservation Seminar

在日常生活中，我們應該注重能源效益，從而減少使用能源對環境造成的影響。我們也可通過許多方法來節約能源。

為了讓市民大眾可以獲得有關節約能源的資訊，機電工程署將舉辦「全方位節約能源」講座，從不同的角度介紹和探討與節能有關的議題，令大家了解有效的節能措施及培養節能習慣。

內容

包括家居和辦公室節能措施、慳油及良好駕駛習慣、能源效益標籤計劃、高效能的照明裝置、及環保資訊科技等等。
(詳情請瀏覽機電工程署的能源資訊園地網頁，網址為http://www.energyland.emsd.gov.hk)

對象

工商樓宇用戶、住宅樓宇住客、辦公室員工、環保行政人員、車主、司機、物業管理人員、學校代表，以及其他對節約能源有興趣的人士。

語言

廣東話

費用

免費

日期

二〇一〇年八月十三日（星期五）

時間

下午二時至五時
（下午一時五十分開始登記入座）

地點

香港科學館演講廳
（九龍尖沙咀東部科學館道二號）

報名

請瀏覽機電工程署的能源資訊園地網頁，網址為 http://www.energyland.emsd.gov.hk

We can easily obtain energy nowadays in our daily life. However, we have to consider the efficient use of energy in order to minimize the environmental impacts brought by the use of energy. An important strategy for reducing our dependence on fossil fuels is improving energy efficiency.

The Electrical and Mechanical Services Department will organise an Energy Efficiency and Conservation Seminar. The purpose of the seminar is to provide to the public useful information on energy efficiency and conservation technologies and practices in different aspects, so as to facilitate the wider adoption of such technologies and practices.

Content

Including household and office energy saving measures, ECO driving practices, energy efficiency labelling schemes, high efficiency lighting, green information and communication technologies. (For details, please visit the EnergyLand website of Electrical and Mechanical Services Department at http://www.energyland.emsd.gov.hk)

Target Audience

Industrial and commercial building occupants, residential building tenants, office worker, environmental executives, vehicle owners, drivers, property management agencies, school representatives and those who are interested in energy saving.

Language

Cantonese

Cost

Free of Charge

Date

13 August 2010 (Friday)

Time

2:00pm to 5:00pm (Registration Commences at 1:50pm)

Registration

Please visit the EnergyLand website of Electrical and Mechanical Services Department at http://www.energyland.emsd.gov.hk

熱泵熱水器 Heat Pump Water Heaters

熱泵是一種可廣泛應用於供暖和冷凍的節能設備。一般而言，供應一個單位的電能給熱泵，它會產生多於一個單位的熱能和多於一個單位的冷能。效能上遠高於其他的加熱方法，這些方法往往因損耗的緣故，一個單位的能源只能提供少於一個單位的熱能。

熱泵的典型應用例子

A. 同時有供暖和冷凍需求的應用如：

體育館- 作淋浴熱水，供活動區空調
桑拿- 作桑拿熱水，供接待處空調
游泳池- 為池水加熱，為泳池附屬範圍降溫或除濕
髮廊- 作洗髮熱水，供場內空調
屋苑的會所- 供各種活動用的熱水，供室內地方空調
餐飲- 作餐飲服務用的熱水，供餐廳、服務處或廚房空調

B 只有供暖需求的應用如：

鍋爐- 熱泵可直接用於製造熱水，或為熱水或蒸氣鍋爐的補給水有效率地預熱
洗衣房- 熱泵能有效率地滿足洗衣設備的大量熱水需求

熱泵及儲水箱
Heat pump with water tank

個案研究

1. 熱水淋浴

一場所中有淋浴間提供給其三班輪值員工使用。個案中將六台275升容量的燃氣鍋爐改為兩台有30千瓦加熱功率的水對水式熱泵，另外加裝兩個各1,000升的儲水箱。每年熱水耗水量約為700立方米。供暖效能系數錄得介乎2.2至2.8。冷能則供應更衣室作空調。該改裝項目的簡單投資回本期約為5.2年。熱泵安裝後，從煤氣和中央空調裝置節省的總能源，每年約為29萬千瓦時。

2. 洗衣場

一個工業洗衣場裝有用柴油作為燃料的鍋爐系統，改造項目加裝了一台新高溫熱泵，將鍋爐系統的部分給水預熱。冷能則用來提供空調給一個小辦公室。熱水一次過加熱到約攝氏60度。平均的供暖效能系數和供暖冷凍總效能系數分別為2.6和3.2。而最高錄得的按日供暖效能系數為4.0。一年的電力消耗約3萬千瓦時，而柴油的消耗則節省約5,500升。簡單投資回本期約為8.6年。

3. 髮廊

典型的髮廊，假設每年消耗1,000立方米的攝氏40度熱水於洗髮上（即每天洗髮約50至100次）。利用高溫熱泵去取代電熱水爐，每年可以節省超過1.4萬度電。增加的額外安裝費用可在約1.8年後回本。髮廊更可享用熱泵提供的冷能，減低空調的消耗。

熱泵雖然能節約不少能源，但應用熱泵時，需留意多方面的配合。詳情請參考本署所出版的「熱泵熱水器」。該小冊子可於網上瀏覽，網址是http://www.emsd.gov.hk/emsd/e_download/pee/HeatPumpPamphlet.pdf。

Heat pump is an energy efficient machine for providing heating and cooling in many applications. Normally, for one unit of electrical energy supplied to a heat pump, it would produce more than one unit of heating energy as well as more than one unit of cooling energy. This is far more efficient than other heating processes which normally produce less than one unit of heating energy due to losses.

Typical heat pump applications

A. Applications with simultaneous demand for both heating and cooling, such as:

Gymnasium- hot water for showers and air-conditioning for activity areas

Sauna- hot water for sauna and air-conditioning for reception counters

Swimming Pool- heating for pool water and cooling or dehumidification for ancillary areas

Hair Salon- hot water for shampoo and air-conditioning for salon

Club House of Housing Estate- hot water provision for various activities and air-conditioning for indoor areas

Catering- hot water for catering services and air-conditioning for dining, servicing areas or kitchen

熱泵熱水器
Heat pump water heater

B. Applications with demand for heating only, such as:

Boilers- heat pumps can be used to generate the hot water directly or serve for pre-heating efficiently the make-up water feeding a boiler system for hot water or steam generation

Laundry- heat pumps to meet efficiently the hot water demands of laundry plants which consume large amount of hot water

Case Study

1. Hot Water Showers

Showers are provided to the staff of three shifts in a venue. Six gas boilers of 275L were replaced with two water-to-water heat pumps of 30kW heating power and two additional storage tanks of 1,000L each. The annual hot water consumption was around 700m^3. $COP_{Heating}$ of around 2.2 to 2.8 was recorded. The cooling energy was used in the changing room. The simple payback period for the retrofit was around 5.2 years. The total amount of energy saved from town gas and in central air-conditioning plant as a result of heat pump installation was around 290,000kWh annually.

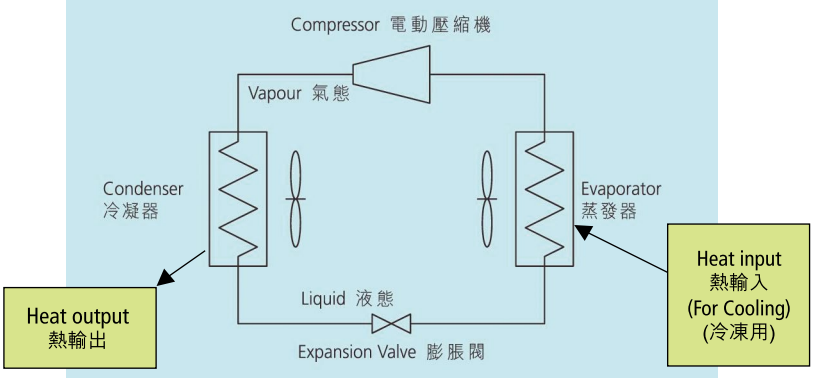
2. Laundry

A new high temperature heat pump was installed in an industrial laundry to preheat part of the make-up to the existing diesel-fuelled boiler system. The cooling energy is used to provide cooling to a small office. Hot water as high as around 60°C was generated in one pass. The average $COP_{Heating}$ and $COP_{Heating+Cooling}$ achieved were 2.6 and 3.2 respectively. The highest daily $COP_{Heating}$ recorded was 4.0. Electricity of around 30,000 kWh was consumed to save around 5,500L diesel annually. Simple payback period was around 8.6 years.

3. Hair Salon

For a typical application, assuming annual consumption of 40°C hot water for shampoo is 1,000 m^3 (around 50 to 100 shampoos per day). Use of a high temperature heat pump instead of electric boiler could save over 14,000 kWh of electricity annually. The incremental cost could be payback in around 1.8 years. Moreover, cooling energy generated could also be used to supplement the air-conditioning in the salon.

Although heat pumps can save much energy in hot water systems, there are a number of points that need attention. For more detail, please refer to our publication "Heat Pump Water Heaters" which can be accessed at:
http://www.emsd.gov.hk/emsd/e_download/pee/HeatPumpPamphlet.pdf



氣體壓縮循環
Vapour Compression Cycle

「強制性能源效益標籤計劃」第二階段涵蓋洗衣機和抽濕機已於2010年3月19日推出

Second Phase of Mandatory Energy Efficiency Labelling Scheme Covering Washing Machines and Dehumidifiers Commenced Operation on 19 March 2010

為方便市民挑選具能源效益的器具，及提升市民對節約能源的意識，政府已透過《能源效益（產品標籤）條例》（第598章）（「條例」）推行強制性能源效益標籤計劃。計劃的首階段涵蓋空調機、冷凍器具及慳電膽，現已全面實施。

至於計劃的第二階段，涵蓋範圍則擴大至洗衣機和抽濕機這兩類電器產品，已於2010年3月19日展開，並設有18個月寬限期。寬限期過後，在本港供應的洗衣機和抽濕機，必須屬已獲編配參考編號的表列型號，並附有能源標籤。

To facilitate the public in choosing energy efficient appliances and raise public awareness of energy saving, the Government has introduced a Mandatory Energy Efficiency Labelling Scheme (the Scheme) through the Energy Efficiency (Labelling of Products) Ordinance, Cap. 598 (the Ordinance). The initial phase of the Scheme covers room air conditioners, refrigerating appliances and compact fluorescent lamps, and has been fully implemented.

The second phase of the Scheme extends the coverage to two more electrical appliances, namely washing machines and dehumidifiers, and has already come into operation on 19 March 2010 with an 18-month grace period. After the grace period, washing machines and dehumidifiers shall be listed models assigned with reference numbers and affixed with energy labels prior to being supplied in Hong Kong.

高能源效益的產品消耗較少能源，有助保護環境，更可為消費者節省金錢。強制性能源效益標籤計劃把同一類產品的能源效益分為5級，方便消費者選擇高能源效益的產品。獲得第一級能源標籤的產品，能源效益最高。

Energy efficient products consume less energy and help protect the environment. They also save consumers' money. To help consumers choose energy efficient products, the Scheme classifies the energy performance of a product type into five grades. A product with Grade 1 energy label means that it is the most energy efficient.

計劃涵蓋的5類訂明產品，能源效益第一級比第三級及第五級可節省的耗電量大約如下：

For the five types of prescribed products, the approximate percentages of energy saving of Grade 1 energy-labelled products as compared to Grade 3 and Grade 5 energy-labelled products are shown in the table below.

節約能源百分比 Percentage of Energy Saving

訂明產品類別 Type of Prescribed Products	第一級比第三級 grade 1 vs grade 3	第一級比第五級 grade 1 vs grade 5
空調機 Room Air Conditioner	15%	29%
冷凍器具 Refrigerating Appliance	35%	49%
慳電膽 Compact Fluorescent Lamp	14%	18%
洗衣機 Washing Machine	25%	40%
抽濕機 Dehumidifier	24%	42%

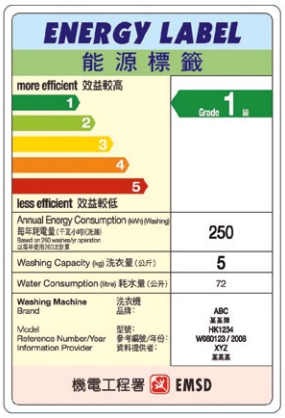
以一台貼有第一級能源標籤而洗衣量為5公斤的水平滾筒式洗衣機為例，與另一部相同洗衣量附有第五級能源標籤的水平滾筒式洗衣機相比，假設每年使用260次及電費平均為每度電$1，第一級的型號每年可節省約$170的電費。另外，以一台貼有第一級能源標籤而抽濕量為每天9公升的抽濕機為例，與另一部相同抽濕量附有第五級能源標籤的抽濕機相比，假設每年使用450小時及電費平均為每度電$1，第一級的型號每年可節省最多75元的電費。

For example, a Grade 1 horizontal drum type washing machine with a washing capacity of 5kg could save up to $170 in electricity cost each year when compared to a Grade 5 model, assuming that it is operated for 260 washes per year and the average electricity bill is $1 per kWh. Also, a Grade 1 dehumidifier with a dehumidifying capacity of 9 litres per day could save up to $75 in electricity cost each year when compared to a Grade 5 model, assuming that it is operated for 450 hours per year and the average electricity bill is $1 per kWh.

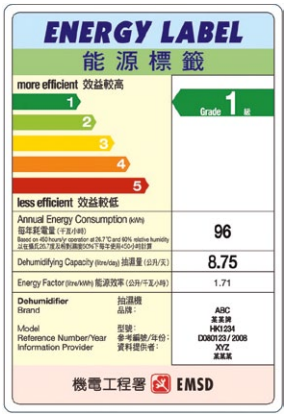
有關計劃的詳細資料，可於機電工程署網址（http://www.emsd.gov.hk/）瀏覽，亦可致電2808 3465機電工程署能源效益事務處查詢。

For details of the Scheme, please visit the website of EMSD (http://www.emsd.gov.hk). For enquiries, please contact the Energy Efficiency Office of EMSD at 2808 3465.

洗衣機和抽濕機的能源標籤樣式 Energy Labels of Washing Machines and Dehumidifiers



洗衣機
Washing Machine



抽濕機
Dehumidifier

新版本的碳審計指引已經出版

New Edition of Carbon Audlt Guidelines Issued

2010年版的《香港建築物（商業、住宅或公共用途）的溫室氣體排放及減除的核算和報告指引》，即一般所指的碳審計指引，現已出版及上載於互聯網路。新版本已更新範圍1、2和3排放源的排放系數，而指引的原則、適用範圍及溫室氣體排放的量化方法依然與第一版相同。2010年版的碳審計指引可於下列網址下載：
http://www.epd.gov.hk/epd/tc_chi/climate_change/files/Guidelines_Chinese_2010.pdf

The 2010 edition of the "Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong", which is also known as 'Carbon Audit Guidelines', is now available on the Internet. This new edition has incorporated the latest updates on the emission factors for Scopes 1, 2 and 3 emission sources while the principles, applicability and quantification methodologies remain in line with the first edition. The 2010 Carbon Audit Guidelines can be downloaded through the link below: http://www.epd.gov.hk/epd/english/climate_change/files/Guidelines_English_2010.pdf

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