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新科技 迎挑戰
Bringing New Solutions to Old Challenges

機電工程署 EMSD

新方案 迎挑戰
Bringing New Solutions to Old Challenges

機電工程署竭誠為客戶提供安全、可靠、高效率和具成本效益的優質服務，並重視環保，精益求精，以提升市民的生活質素。為此，我們不斷掌握每個服務領域的科技發展和流程改善，以提供更佳服務。本期《機電傳聲》將為大家介紹我們如何將先進科技應用到為客戶部門進行的工作上。

The Electrical & Mechanical Services Department is committed to providing safe, reliable, efficient, cost-effective and quality services to our customers. We also care for the environment. Our aim is to improve the quality of life for our community through continuous enhancement of our electrical and mechanical engineering services. As such, we always keep pace with technology development and process improvement in every service area for continuous service enhancement. In this issue, we will be demonstrating how we apply the latest technologies in our work for client departments.

綜合樓宇管理系統 提高操作及維修保養效率
iBMS Enhances O&M Productivity

機電署致力探討應用先進科技以為客戶提供優質服務。自2013年，我們其中一項試行的項目便是以政府大樓作試點應用綜合樓宇管理系統（iBMS），目的是提升操作和維修保養效率，好讓客戶安心。

我們於今年年中為綜合樓宇管理系統進行的初步檢討結果令人鼓舞。未來七年，我們將陸續為我們所提供維修保養服務的政府大樓設置綜合樓宇管理系統。

當整個綜合樓宇管理系統安裝完成後，我們便可將機電、空調和屋宇裝備系統整合到單一應用平台，以方便監測，同時亦為日後提升中央遙距監測系統性能奠下基礎，加強與客戶的溝通，讓他們了解系統的運作情況。

常言道，預防勝於治療，綜合樓宇管理系統亦配備具預警功能的自動故障／警報報告系統。如發現特定的設備或裝置出現任何異常，系統便會自動發送短訊給我們的駐場工作人員，讓他們盡早作出應對，避免任何潛在故障發生，縮短設備故障時間及提升各系統的可供使用率，讓客戶稱心滿意。

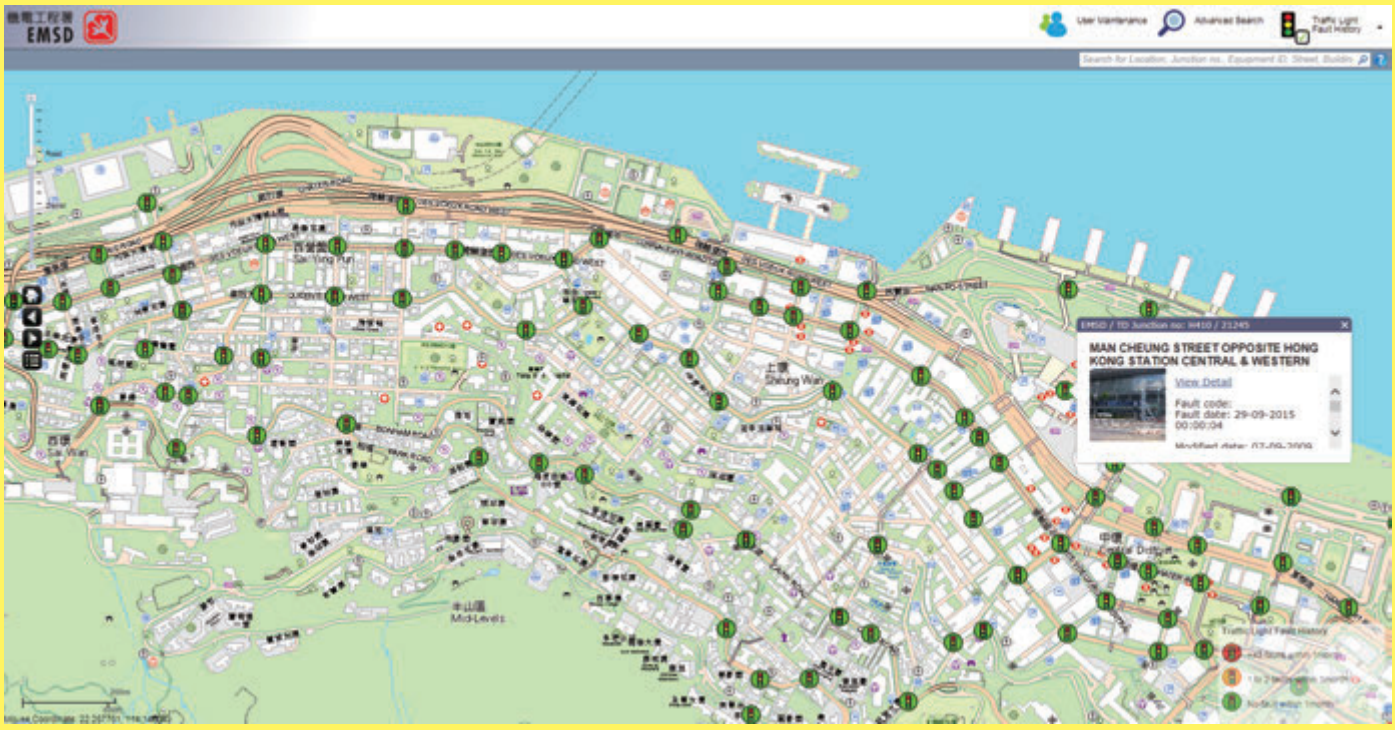
EMSD is committed to exploring applications of new technologies to deliver quality services to our clients. Since 2013, one of our pilot projects was to implement integrated Building Management System (iBMS) for government buildings to enhance O&M productivity for the sake of customers' peace of mind.

Initial review of the iBMS in mid-2015 was encouraging. We will implement iBMS to more government buildings under our maintenance in the next seven years.

After completion of iBMS, we can integrate the electrical, mechanical, air-conditioning and building services systems (EMABS) into a single application for easy monitoring. It paves the way for our future upgrade on centralised remote monitoring system with greater capacity for enhancing communication with clients and keeping them informed of the system status.

Prevention is better than cure! iBMS also offers an automatic fault/alarm reporting system with the pre-alarm function. If any abnormality of the pre-selected equipment or installation is identified, short message will be automatically sent to our site staff calling for early actions to prevent potential failure, reduce down time and increase system availability, and thus upkeeping client satisfaction in a long term.

立法會綜合大樓將納入綜合樓宇管理系統先導項目，以測試該系統監測機電、空調和屋宇裝備系統操作及維修保養工作的成效。
The Legislative Council Complex will be covered in the iBMS pilot project to test its effectiveness in O&M monitoring of EMABS.



以地理資訊系統為基礎的遙距監測系統，裝置了多個操作界面，方便進行資產管理工作。上圖的用戶介面顯示各交通燈的位置和狀況。
In the GIS-based Remote Monitoring System, multi-operational layers have been implemented to facilitate asset management activities. The above user interfaces show the locations and healthiness of various traffic lights.

地理資訊遙距監測系統 提升資產管理和操作支援

GIS-based Remote Monitoring System Enhances Asset Management and Operation Support

為提供更優質的操作維修服務及提升機電設備的資產管理，機電署特別為政府約1,800個交通信號燈，以及安裝在香港300多條行人天橋的升降機和自動扶梯，開發了以地理資訊系統為基礎的遙距監測系統。

地理資訊遙距監測系統於2014年年底推出，現時，如交通燈發生故障，我們能實時找出準確的位置，迅速進行維修，此舉有助減少交通燈的故障時間。

我們現正制訂優化計劃，將地理資訊遙距監測系統擴展至部分政府場地的電力配電裝置及行車和行人隧道的水浸警報系統，亦考慮將該遙距監測系統的覆蓋範圍，擴展至機電署負責操作維修的其他重要機電資產，例如消防及空調設備等。

地理資訊遙距監測系統有如一個中央信息中心，會從不同的遙距監測裝置或後端支援系統，例如各個區域交通控制系統，收集相關資產的信息、貼近實時的狀況和健康情況，並發布統一視圖，使工作人員能夠監察資產設備的操作狀態，進行故障分析，並為相關資產制定更佳的生命周期管理策略。

地理資訊遙距監測系統的獨特設計，讓我們得以最少的人力資源密切監測相關設備的操作情況，以減低故障帶來的影響。

To provide better operation and maintenance services to clients and to improve management of E&M assets, EMSD has developed a Geographic Information System (GIS)-based Remote Monitoring System for around 1,800 traffic signals, and lifts and escalators installed at some 300 footbridges in Hong Kong.

With the launch of the System in late 2014, we can now identify faulty traffic lights at their exact locations in real time.This allows for prompt rectification of problems and thus, reduces the down time of traffic lights in general.

Enhancement plans are being devised to extend the System to support remote monitoring of other major assets under EMSD's maintenance, such as electrical switchboard installations in some government venues and flooding alarm systems in underpass and subways. Feasibility to extend the System to other major assets under EMSD's maintenance, such as fire services and air-conditioning installations are being explored.

The GIS-based Remote Monitoring System serves as a centralised information hub providing consolidated views of relevant asset information, close-to-real time monitoring of asset conditions and asset healthiness, which can be collected from different remote monitoring units installed in the E&M assets, or backend systems, such as various Area Traffic Control systems, in Hong Kong. Staff members can visualise the asset and equipment status, and perform fault related analysis to formulate a better life cycle management strategy for the associated assets.

The unique design of the System allows close monitoring of the equipment with minimal staff resources and service interruption.

智能電錶 聰明節能
Smart Energy Saving with Smart Metering System

機電工程署為政府建築物提供多元化的機電工程服務，並能善用智能電錶系統，幫助客戶部門達至能耗監察和節能的效果。

智能電錶系統讓我們開拓能源效益及節能的新領域，為客戶部門提供嶄新和改善能耗的服務。智能電錶系統可用於監控及優化建築物內各主要耗電系統，如空調系統、電力系統、照明系統等的表現，亦可提供能耗記錄作能源審核用途，令節能減排成為可持續發展的進程。

機電工程署現正為部分政府主要建築物，例如香港警察總部大樓、民航處總部大樓、香港海關總部大樓和土木工程拓展署大樓等進行能源審核。在已安裝智能電錶系統的場地，我們可根據收集到的能源數據，為各政策局和部門分析及開發能源管理機會。至於其他場地，我們會建議客戶加裝智能電錶系統，供日後監察及分析之用。

Being the service provider of a wide range of electrical and mechanical engineering equipment and system in government buildings, EMSD can best use the smart metering system to help client departments on energy consumption monitoring and saving.

Smart metering system can open up opportunities for energy efficiency and conservation, as well as new and improved services for client departments. The system can be employed to monitor, control and optimise the performance of major energy consuming building services systems including but not limited to air-conditioning system, electrical system, and lighting system. The system can also provide energy records for energy audits and review so that energy saving becomes a sustainable and continuous process.

EMSD is now carrying out energy audits for some major government buildings such as Police Headquarters, Civil Aviation Department Headquarters, Customs & Excise Headquarters, and Civil Engineering and Development Department Building. For those venues already equipped with the smart metering systems, we can make use of the energy data collected so as to help bureaux and departments identify their potential energy management opportunities. For other venues, we would recommend clients to install the smart metering system for future monitoring and analysing purpose.

智能電錶的外貌跟舊式的電錶相似，但內置智能及溝通模式。
The smart meter looks like the traditional Electro-Mechanical meter, but has built-in intelligence and communication functions.

先進燈控技術 節省資源

機電工程署為本港市政及康樂場地和設施提供優質的維修保養服務，當中包括公園和運動場地的照明系統，確保各種場地和設施能運作暢順，供市民享用。

隨着科技發展，我們更不斷探索先進的照明控制技術和照明設備，好讓客戶更能善用資源，節能減碳，加強能源管理的效率。

我們為公園部分照明設備安裝天文定時開關裝置。只要輸入地點和經緯度，天文定時開關裝置便會自動計算出日出、日落時間，智能地控制照明設備的開關，達到節能的目的；而且更可免除人手調校冬、夏兩季的開關時間，節省資源。

在戶外運動場地，如硬地足球場和籃球場等沒有駐場人員的地方，我們按場地需要加裝遙控設備，利用智能電話監控場地照明系統。在偏遠的地方，或遇上惡劣天氣如颱風或暴雨，工作人員便可透過智能電話遙控場地的燈光開關，減低危險和減省操作資源。

強化無油磁浮式製冷機支援服務
Reinforce Support for Oil-free Chillers

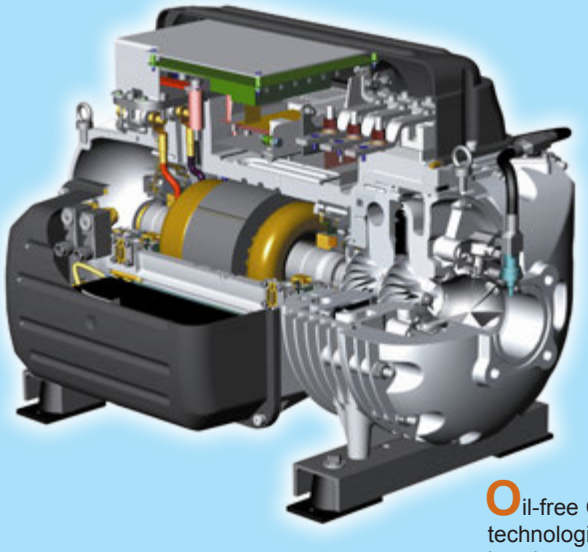
無油磁浮式製冷機採用最新的無油磁浮軸承壓縮機技術，能大幅節省能源耗量，是空調技術的發展趨勢，惟對合資格維修人員和技術支援的需求亦甚為殷切。

機電工程署全力支持新節能技術的應用以協助客戶邁向更環保作業。今年7月，我們派出兩個團隊到訪無油磁浮軸承壓縮機製造商 Danfoss Turbocor Compressor (DTC) Inc. 位於中國海鹽的地區服務中心，除參與維修技術培訓外，我們亦成功與製造商達成協議，在機電署總部推出培訓員訓練先導計劃，並成立遙距監測計劃試點，加強製造商的技術支援。這是繼去年9月我們到訪製造商位於美國的基地學習重點技術後，再進一步為長遠技術支援和培訓合作鋪路的另一個新里程。

醫院管理局將於今年冬季開始安裝第一批共27台全新的無油磁浮式製冷機，我們有需要加強在保養維修技術方面的技術支援及訓練。

機電署是本港首個客戶與DTC Inc.合作推出培訓員訓練先導計劃。我們會安排有潛質的同事參加計劃，當他們成為先驅導師後，將會有效加強我們長遠的技術人員培訓，以滿足無油磁浮式製冷機的維修保養服務需求。

遙距監測計劃會透過網絡，將無油磁浮式製冷機的實時運行數據傳送到製造商位於中國海鹽的地區服務中心。如檢測到有不正常的情況發生，製造商便可以第一時間進行分析並發出預警，讓我們可以在事故發生前進行檢修，減少對客戶運作的影響。



無油磁浮式製冷機採用最新的無油磁浮軸承壓縮機(左圖)技術，能大幅節省能源耗量。
Oil-free Chillers, using the latest technologies in oil-free magnetic levitation bearing type compressors (left), can save significant energy consumption.

Oil-free Chillers (OFCs), using the latest technologies in oil-free magnetic levitation bearing type compressors, can save significant energy consumption. This trend of air-conditioning is generating high demand for competent servicing personnel and technical support.

EMSD supports the application of new energy saving technologies to facilitate our clients for more environmental friendly operation. In July, two EMSD teams visited the Regional Service Centre (RSC) of Danfoss Turbocor Compressor (DTC) Inc., manufacturer of oil-free compressors, in Haiyan China. Apart from service training, our teams have successfully concluded with the manufacturer to kick-off a pilot Train-the-Trainer programme at EMSD Headquarters, and a pilot remote monitoring scheme to enhance the technical support by the manufacturer. This trip is a new milestone in paving the long term technical support and training cooperation after our visit to DTC Inc. in the United States for learning the key technologies in September last year.

The Hospital Authority will be installing the first batch of 27 new OFCs in winter this year. It is essential for us to reinforce our servicing skills and training.

EMSD is the first user client to cooperate with DTC Inc. to launch the pilot Train-the-Trainer programme in Hong Kong. We will train up potential colleagues to become pioneer mentor and they will effectively enhance our long term training to meet the servicing demand of OFC in near future.

The remote monitoring scheme will connect the real-time operating data of OFC to the manufacturer's RSC in Haiyan via network. If there is any abnormality detected, the manufacturer can carry out diagnosis earlier and alert us, so that we can fix the problem before equipment breakdown as well as to minimise service interruption to our client.

Save More with Advanced Light Control Technologies

Being the operation and maintenance agent of most municipal and recreational venues and facilities, EMSD works diligently to ensure that these venues and facilities, including parks and sports grounds, function smoothly for the enjoyment of everyone in Hong Kong.

With advancement of technologies, we always strive to explore sophisticated light control technologies and facilities for clients, enabling them to better utilise resources, save energy and thus enhance efficiency of energy management.

In parks, we conducted some improvement projects to install astronomical time switch to the lighting systems. After we key in our location and coordinates on the map, the astronomical time switch will automatically calculate the sunrise and sunset times, thereby switching on and off the lighting smartly to achieve energy saving. It also eliminates the needs to manually change the time switch in summer and winter so as to save resources.

In sports grounds such as hard-surfaced soccer pitches and basketball courts with no resident staff, we would base on the venue's needs to install electronic devices for controlling the lightings via smart phones. In remote places or during adverse weather conditions, such as typhoon or rainstorm, staff can remotely monitor and control the lighting switch with their smart phones, minimising risk and operation.

致力能源管理獲確認

機電署總部大樓獲ISO 50001認證

Effort in Energy Management Recognised

ISO 50001 Accreditation Awarded to EMSD Headquarters Building

機電工程署一直致力推動能源效益及綠色建築。為確保我們的能源管理工作採用先進技術並達至國際標準，自2013年年底開始，我們便成立能源管理委員會，負責統籌本署總部大樓建立ISO 50001 能源管理體系的各項事宜。今年2月，總部大樓終於成功通過審查，取得ISO 50001 能源管理體系認證，並成為首幾幢獲 ISO 50001 認證的香港特區政府大樓之一，亦確認了機電署在能源管理方面的努力。

我們將與客戶分享能源管理的經驗，並積極協助他們進行能源管理的工作，建議節能新技術及相關機電設備，以達至節能減廢的目的。

為籌備 ISO 50001 的認證事宜，能源管理委員會率先造訪已取得認證的兩幢建築物的管理層，以汲取經驗；最後，在ISO 50001標準的框架下，我們確立了能源管理體系的政策方針、適用範圍和目標，制定了一套全面的能源計劃方案，建立了一個能持續監控和改進的機制，編制了一套質量文件包括系統手冊、系統程序手冊和各種系統管理記錄，並安排了多個培訓課程予相關人士。

透過委員會的大力推廣和執行，物業設施管理組的全力支援，以及總部大樓所有員工的全力配合，總部大樓榮獲ISO 50001能源管理體系認證。

EMSD is dedicated to promoting energy efficiency and green building. To ensure our energy management work is technologically advanced and up to the international standard, we set up an Energy Management Committee (EMC) at the end of 2013 to prepare the EMSD Headquarters Building for the ISO 50001 energy management system accreditation. In February this year, the headquarters building successfully passed the ISO 50001 audit and got the accreditation. It was one of the first few government buildings obtaining the ISO 50001 accreditation, which also recognised our effort in energy management.

We will share our energy management experience with our clients, and proactively assist them in developing energy management work. We also recommend new energy saving technologies on related E&M facilities to our clients to achieve energy saving and greenhouse gas emission reduction.

In preparing for the ISO 50001 accreditation, EMC visited and learned experiences from the management of the two accredited buildings. Under the framework of ISO 50001 standard, we established energy policy, identified appropriate objectives and scope, developed comprehensive energy performance indicators, implemented energy action plan for continual monitoring and improvement, and prepared a full set of quality documents, including system manual, procedure manual, and records of all related systems. We also organised training programmes for staff and related personnel.

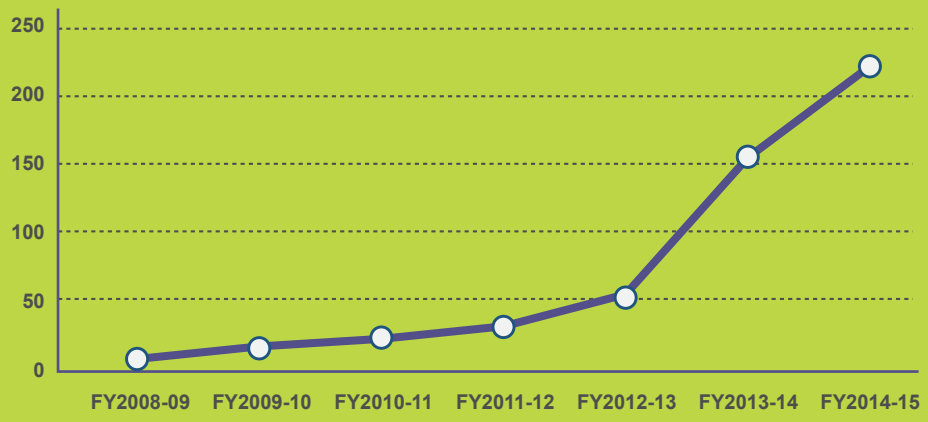
With a collaboration of EMC, the Estate Management Unit and staff at the headquarters building, our efforts in energy management is demonstrated and recognised by the award of ISO 50001 energy management system accreditation.

在 ISO 50001 檢閱過程中，我們在「無油磁浮式製冷機」的冷凝水系統上安裝了一個電磁感應防水垢系統來改善總部大樓空調系統的能源效率；結果，製冷機的性能系數提高了約12.9%，每年可節省約81,358度電。

Based on the review of ISO 50001, EID Descaling system was installed in the oil-free chiller condensing water system as one of the energy efficiency improvements to the air-conditioning system at headquarters building. The coefficient of performance of the oil-free chiller was improved around 12.9% after the improvement work and the totalised annual saving in energy was around 81,358kWh.

協助綠化政府車隊
Help Government Fleet Go Green

政府車隊的電動車數目(2008–2015)
Number of EVs in Government Vehicle Fleet (2008 – 2015)



機電工程署負責為政府採購及維修保養約5,800輛車的政府車隊，除各種轎車及貨車外，更包括各種特別車輛，例如救護車、流動圖書館、流動郵政局和垃圾車等。隨着科技進步，多種高性能的電動車相繼在市場推出，為此，我們全力推動政府車隊廣泛使用新一代的電動車，以支持政府節能和減碳的環保政策，並在多方面以先進科技作出配合，冀能起先導作用，帶領使用電動車潮流，尤其是多使用商用電動車，長遠以達至節省燃油、減少廢氣排放及降低操作成本的目的。

目前，政府車隊中約有200多部電動車。我們會繼續為客戶部門採購更多先進、配備更高功率車載充電器、同時符合IEC(即國際電工技術委員會)標準的電動車，例如最近採購的電動車便能使用32安培掛牆盒式充電裝置於四小時內完全充電，並且根據路面情況，可行走超過一百五十公里。

同時，我們會與電動車生產商保持聯絡，並緊貼科技發展，適時更新電動車標書的要求，以便在世界各地採購適合客戶操作要求的車種。我們亦會加強電動車充電基礎設施，例如在政府部門和公眾停車場內增設充電站，以滿足未來電動車的增長需求。

電動車輛充電設施屬於固定電力裝置。為協助電動車使用者、註冊電業承辦商、以及註冊電業工程人員了解不同的充電設施，我們在2011年已公佈《電動車輛充電設施技術指引》，並在今年4月出版新的《技術指引》，詳細描述各種不同的充電模式以供業界參考。

EMSD is responsible for the procurement and maintenance of the Government's 5,800-plus-vehicle fleet, which includes saloon cars and goods vehicles, as well as some specialised vehicles like ambulances, mobile libraries, mobile post offices and refuse collection vehicles. With advancement of technology and launch of various types of high-performance electric vehicles (EVs) in the market, we actively promote wider use of new generation electric vehicles in the Government fleet to support the Government's environmental policy of energy saving and carbon reduction. As such, we will implement various technologically advanced measures to achieve our goal. We hope we can lead the trend of using EVs in Hong Kong, especially commercial EVs, and in the long term, reduce fuel consumption and hence greenhouse gas emission, and save operational costs.

Now, there are more than 200 EVs in the Government fleet. We will continuously procure for our client departments new EV models equipped with more advanced and higher power on-board chargers that support the IEC standard. One of the examples is a new EV model that can be fully recharged by a 32A wall box within four hours and run more than 150 kilometres, based on the road conditions.

We liaise with manufacturers to identify suitable types and models of EVs in the global market that fits our client's operational needs. We also make regular revision of EV procurement contract to match the technology advancement. To meet the future needs of EVs, we will establish an extensive charging infrastructure, such as building more charging points in government premises and public carparks.

EV charging facilities are fixed electrical installations. To help EV users, registered electrical contractors and registered electrical workers understanding the setting up of different charging facilities, a set of Technical Guidelines on Charging Facilities for Electric Vehicles (the Technical Guidelines) was promulgated in 2011. The new edition of the Technical Guidelines was revised and launched in April 2015, detailing the different charging modes for the trade's reference.

我們將繼續採購電動車，滿足客戶的運作需要。
We keep procuring more EVs to meet client's operational needs.

齊來參與「慳電熄一熄青年獎」大賽

協力減少碳排放

Join in the "Youth Energy Saving Award" Competition

Collaborate to Reduce Carbon Emissions

作為「全民節能」運動的一部分，「慳電熄一熄青年獎」由環境局和機電工程署聯合主辦，目的是教育年輕人有關節能的重要性和加強他們對日常生活中減少碳排放的了解。

我們誠邀25歲或以下的學生及年輕人組成十人一隊的隊伍參賽，並於2015年10月15日或之前報名登記。

參賽隊伍可揀選參加以下其中一組類別：1.小學組；2.中學組；3.公開組。

比賽將分為兩個階段進行。第一階段是由網上問答比賽及慳電比賽組成。第二階段則由第一階段晉級的隊伍進行節能方法和措施簡報比試。

每組入圍隊伍將獲頒發白金、金、銀和銅獎。中學組及公開組白金獎隊員更可獲得參與海外低碳城市學習團，小學組白金獎隊員可獲得參與本地節能環保學習團。

As part of the "Energy Saving For All" campaign, the "Youth Energy Saving Award" Competition is organised by the Environment Bureau and EMSD to educate the younger generation about the importance of energy saving and enhance their understanding on how to reduce carbon emissions in their daily lives.

Students and youngsters aged up to 25 are encouraged to form teams of ten members to participate in the Competition. All teams shall register on or before 15 October 2015 for the enrollment.

Participating teams may join the Competition under one of the following categories: 1.Primary School Category; 2. Secondary School Category; 3. Open Category.

The Competition is divided into two stages. Stage One is composed of the online quiz and electricity saving competition. Stage Two is on presentation on energy saving methods and measures by shortlisted teams from Stage One.

Platinum, Gold, Silver or Bronze awards will be presented to each category. Members of the Platinum award winning teams from the Secondary School Category and Open Category will be nominated to join an overseas low carbon city learning tour. Members of Platinum award winning team from the Primary School Category will be nominated to join a local low carbon city learning tour.

如欲了解比賽詳情，請參考網站：www.energysaving.gov.hk或透過以下QR代碼瀏覽網站：

For details of the Competition, please visit the website: www.energysaving.gov.hk or scan the QR code below:

您的寶貴意見對我們非常重要！如大家對《機電傳聲》有任何意見或回應，請隨時聯絡我們，讓我們不斷改進。
如果您的同事有興趣收取本通訊及加入郵寄名單，歡迎以電郵（bssd@emsd.gov.hk）或傳真（傳真號碼：2882 1574）方式通知我們。
如果您希望我們從郵寄名單中刪除您的名字，或更新您的資料，請透過電郵（bssd@emsd.gov.hk）與我們聯絡。

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