

智能 EnergyWits

舉辦「綠色創科日」 - 推動減碳節能創科
The Green Innovation and Technology Day
promotes Innovation and Technology solutions
for energy saving and decarbonisation



《粵港澳大灣區既有建築節能改造合作備忘錄》

Memorandum of Co-operation on Building Energy Saving Retrofit in the Guangdong-Hong Kong-Macao Greater Bay Area

能源效益、節約能源及可再生能源網上講座《邁向碳中和的路徑》 - 供中小企及物業管理公司參加
EE&C Webinars "Path to achieve Carbon Neutrality" for SME and Property Management Companies

通過有效的監管和合作，提高建築物能源效益以實現碳中和目標
Enhancing Energy Performance of Buildings towards Carbon Neutrality by Regulation and Collaboration

採電學社小學教材套
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國際環保博覽2022
Eco Expo Asia 2022





舉辦「綠色創科日」 - 推動減碳節能創科

The Green Innovation and Technology Day promotes Innovation and Technology solutions for energy saving and decarbonisation

環境及生態局與本署一直積極推動善用創新科技，以應對氣候變化和支持於2050年前實現碳中和。

第三屆「綠色創科日」為香港特別行政區成立25周年的慶祝活動之一。環境及生態局、機電工程署（機電署）與廣東省科學技術協會於去年十一月三日合辦此活動，以展示本港和大灣區其他城市在節能及可再生和新能源方面的創科成果。活動吸引超過160名來自創新科技、機電業、大學、公營機構等界別的人士親臨參與，超過100 000人次在網上觀看直播。

The Environment and Ecology Bureau (EEB) and the Electrical and Mechanical Services Department (EMSD) have been promoting the application of innovation and technology in a bid to mitigate climate change and strive towards carbon neutrality before 2050.

The 3rd Green I&T Day is one of the celebratory events for the 25th anniversary of the establishment of the Hong Kong Special Administrative Region. The EEB, the EMSD, and the Guangdong Provincial Association for Science and Technology jointly hosted the event on 3 November last year to showcase the I&T solutions on energy efficiency and new and renewable energy in Hong Kong and other cities in the Greater Bay Area. The event



活動吸引超過160名人士出席

Over 160 participants attended the event



機電工程署署長彭耀雄（左）和中央人民政府駐香港特別行政區聯絡辦公室教育科技部處長郭建華（右）透過視像與其他嘉賓一同主持綠色創科日啓動禮

The Director of Electrical and Mechanical Services, Mr Eric Pang (left), and the Director, Department of Educational, Scientific and Technological Affairs of the Liaison Office of the Central People's Government in the Hong Kong Special Administrative Region, Ms Guo Jianhua (right), officiating at the kick-off ceremony of Green I&T Day with other guests via video-conferencing.



活動得到本地和內地相關機構支持，多名本地和內地專家、學者和創科者親身或線上出席活動並分享其創科成果和經驗，以加快減碳轉型。香港會場的展覽區亦匯聚20個香港及內地參展商，展示他們減碳方面的創科成果。

環境及生態局代言人表示，為配合國家的「雙碳」目標，香港特區致力爭取於二〇五〇年前實現碳中和，並力爭在二〇三五年前把香港的碳排放量從二〇〇五年的水平減半。他鼓勵各界把握綠色創科帶來的減碳機遇，響應爭取碳中和的工作。

機電署署長彭耀雄先生表示，機電署未來會繼續深化與內地及本地科研機構的綠色創科合作，亦會充分利用綠色創科以提升本港的整體能源表現。

詳情可瀏覽活動網頁：www.greenitdayhk.com。

successfully attracted over 160 participants from various sectors including innovation and technology (I&T), the electrical and mechanical trade, universities and public organisations. Over 100 000 views were recorded for the live broadcast.

Various organisations in Hong Kong and Mainland supported the event, and experts from Hong Kong and the Mainland shared their achievements and experiences in decarbonisation through adoption of I&T to accelerating low carbon transformation. The event also brought together 20 local and Mainland exhibitors to Hong Kong to showcase their I&T achievements in decarbonisation.

The spokesperson from the EEB said that with a view to aligning with the national "dual carbon" targets, the HKSAR strives to achieve carbon neutrality before 2050 and reduce the total carbon emissions from the 2005 level by half before 2035. We called for concerted actions to capitalise on the decarbonisation opportunities presented by green I&T, in pursuit of carbon neutrality.

The Director of Electrical and Mechanical Services, Mr Eric Pang, said that the EMSD would continue to deepen green I&T collaboration with the research institutions in the Mainland and Hong Kong, and enhance the overall energy performance of Hong Kong by fully adopting green I&T.

For details of the Event, please the website:

www.greenitdayhk.com



■ 參加者於展覽區觀看展示板

Participants attending the exhibition at the Event



■ 參加者於展覽區觀看展示板

Participants attending the exhibition at the Event

《粵港澳大灣區既有建築節能改造合作備忘錄》 Memorandum of Co-operation on Building Energy Saving Retrofit in the Guangdong-Hong Kong-Macao Greater Bay Area

機電工程署(機電署)於2022年11月3日與多個來自本港、澳門、大灣區及其他內地城市的專業機構、行業協會和學術界，簽署《粵港澳大灣區既有建築節能改造合作備忘錄》，共同研究及推廣既有建築節能改造技術，為提高建築物的能源效益作出貢獻。這是繼2018年簽署的《粵港澳大灣區建築物重新校驗(再調適)合作備忘錄》延伸於粵港澳大灣區內，關於建築物能源效益的第二個合作備忘錄。機電署亦於同日與各合作單位進行第一次全體會議，交流既有建築節能改造心得以及訂定合作細節。

香港一直積極應對氣候變化的工作，政府於2021年宣布訂下四項減碳策略，包括淨零發電、節能綠建、綠色運輸和全民減廢，致力爭取於2050年前實現碳中和。在節能綠建方面，為持續減碳，機電署會確保能源效益標準與時並進。最新的2021年版《建築物能源效益守則》(《守則》)已經較2015年版整體提升超過15%，估計可在2035年為本港建築物每年節省約47億至53億度電(與2015年相比)，有助於2050年前實現《香港氣候行動藍圖2050》所定下的碳中和目標。



■ 《建築物能源效益守則》2021年版
Building Energy Code (BEC) 2021 Edition

The Electrical and Mechanical Services Department (EMSD) signed a Memorandum of Cooperation (MoC) on Building Energy Saving Retrofit in the Guangdong-Hong Kong-Macao Greater Bay Area with various professional bodies, trade associations and academia in Hong Kong, Macao and Mainland on 3 November 2022 to jointly develop and promote building energy retrofit technologies with a view to enhance building energy efficiency. This is the second MoC on building energy saving that extends from the current MoC on Retro-commissioning (RCx) of Buildings in the Guangdong-Hong Kong-Macao Greater Bay Area signed in 2018. On the same day, the EMSD also held the first plenary meeting with the MoC signatories to exchange insight on building energy saving retrofits and discuss on the cooperation details.

Hong Kong has always been proactive in tackling climate change. In 2021, the Government announced four major decarbonisation strategies, namely "Net-zero Electricity Generation", "Energy Saving and Green Buildings", "Green Transport" and "Waste Reduction", aiming at achieving carbon neutrality before 2050. For "Energy Saving and Green Buildings", EMSD would keep the building energy efficient requirements abreast of the times to ensure continuous decarbonisation of buildings. The latest 2021 edition of the Building Energy Code (BEC) uplifts the energy efficiency standards with an improvement of more than 15 per cent as compared with the 2015 edition. By 2035, the estimated annual energy saving is expected to bring about an annual energy saving of around 4.7 billion to 5.3 billion kWh from buildings in Hong Kong (compared with 2015), which will help Hong Kong achieve the carbon neutrality target before 2050 as set out in the Hong Kong's Climate Action Plan 2050.

The new MoC also offers a solid foundation for the signatories to build capacity through sharing of knowledge, experience and expertise, so as to deepen the professional knowledge of existing building energy saving



■ 《粵港澳大灣區既有建築節能改造合作備忘錄》簽署儀式
Signing ceremony of MoC on Building Energy Saving Retrofit in
Guangdong-Hong Kong-Macao Greater Bay Area



■ 《粵港澳大灣區既有建築節能改造合作備忘錄》
第一次全體會議
The first plenary meeting of MoC on Building Energy
Saving Retrofit in the Guangdong-Hong Kong-Macao
Greater Bay Area

此合作備忘錄亦提供堅實基礎，讓各簽署機構分享知識、經驗和專長，以至深化大灣區既有建築節能改造從業人員和服務提供團隊的專業知識，並推廣節能改造至大灣區其他城市。合作備忘錄的簽署，標誌着多個來自本港、澳門、大灣區及其他內地城市的機構進一步合作，把節能改造的成效進一步提升，讓國家及香港早日達至碳中和。

粵港澳大灣區建築物重新校驗(再調適)合作 - 第四次全體會議

Memorandum of co-operation on RCx of buildings in GBA – 4th Plenary meeting

重新校驗是一項有系統及成本效益的檢測方法，藉着定期檢查既有建築物的能效表現，制定一套以科學為本的可行優化方案，達致持續改善屋宇裝備裝置的能效表現。

為推廣在大灣區應用重新校驗去持續改善建築物的能效表現，機電工程署及香港綠色建築議會於2018年11月聯同大灣區另外5間機構及學院，包括屋宇設備運行及維修行政人員學會、澳門機電工程師學會、廣州華南理工大學廣東省城市空調節能與控制工程技術研究開發中心、北京清華大學建築節能研究中心和上海市建築科學研究院，共同簽訂了【粵港澳大灣區建築物重新校驗(再調適)合作備忘錄】。

於2022年11月3日，一眾備忘錄合作機構經線上進行了第四次全體會議，會上各成員就重新校驗(再調適)的技術發展、人才培訓以及宣傳推廣三個範疇匯報及分享了過去的工作進程，包括國內試點項目的成功案例、培訓課程的參與情況以及各地舉辦的研討會等。機電工程署亦分享了於香港政府建築物實施重新校驗的進程和經驗，以及優化網上重新校驗資源中心的計劃。

展望未來，備忘錄合作機構將繼續就大灣區推廣應用重新校驗(再調適)攜手合作，分享知識和經驗，推動建築物節能，一起邁向碳中和。



■ 機電工程署助理署長朱祺明先生（前右4）與一眾參與機構代表於2022年11月3日線上出席粵港澳大灣區建築物重新校驗(再調適)合作第四次全體會議

Mr. CHU Kei Ming, Barry, Assistant Director/Electricity and Energy Efficiency of EMSD (Front right 4) and representatives from participating organisations in the 4th Plenary meeting of Memorandum of co-operation on RCx of buildings in GBA on 3rd November 2022.

retrofit practitioners and service providers in the Greater Bay Area and promote building energy retrofit to other cities in the Greater Bay Area. The signing of the new MoC marks the further collaboration between various organisations from Hong Kong, Macao, the Greater Bay Area and other Mainland cities to further improve building energy efficiency when undergoing building energy retrofit and RCx in order to strive towards carbon neutrality.

Retro-commissioning is a systematic and cost-effective process to periodically check the energy and other performances of an existing building. The process identifies operational improvements that can optimize energy efficiency performance of the buildings

In order to promote the application of retro-commissioning in the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) to continuously improve the energy performance of buildings, EMSD in November 2018 signed a memorandum of co-operation (MOC) with the Hong Kong Green Building Council and 5 other institutes and universities in GBA, including the Building Services Operation and Maintenance Executives Society, the Macao Institution of Electrical and Mechanical Engineers, the City Air-conditioning Energy Conservation and Control of Guangdong Project Technology Research Exploitation Center of the South China University of Technology, the Building Energy Conservation Research Center of Tsinghua University and the Shanghai Research Institute of Building Sciences.

The MOC parties conducted its 4th Plenary meeting on 3rd November 2022 via online platform. Members shared and reported the work progress on three aspects on RCx — technical development, capacity buildings and publicity and promotions, including RCx pilot project in Mainland China, participation in training programme and seminars in different regions. EMSD has also shared the progress and experiences of conducting RCx in government buildings in Hong Kong, and the plan of revamping the on-line RCX Resource Centre.

Looking ahead, the MOC parties will continue to work together on promoting the application of RCx in GBA, share knowledge and experience in promoting building energy conservation in buildings towards carbon neutrality.

能源效益、節約能源及可再生能源網上講座《邁向碳中和的路徑》 - 供中小企及物業管理公司參加 EE&C Webinars “Path to achieve Carbon Neutrality” for SME and Property Management Companies

特區政府一直非常重視氣候變化。為回應巴黎協定，特區政府於2017年公布《香港氣候行動藍圖2030+》。2021年10月，再推出《香港氣候行動藍圖2050》，以「零碳排放・綠色宜居・持續發展」為願景，提出香港應對氣候變化同實現碳中和四大減碳策略，包括淨零發電、節能綠建、綠色運輸以及全民減廢。機電工程署(機電署)為實現提升建築物能源效益同節約管理，多管齊下實行節能綠建工作，包括立法規管及向業界和公眾人士作出推廣。

能源效益、節約能源及可再生能源網上講座《邁向碳中和的路徑》 - 於2022年8月4日和24日與及9月7日和21日舉辦了四場網上講座供中小企及物業管理公司參加。網上講座發表了六個關於能源效益、節約能源及可再生能源的題目，包括碳中和、節能約章2022及4T約章、可

再生能源及上網電價計劃、建築物電力使用指數網上基準工具(「網上基準工具」)、重新校驗計劃及個案分享、及強制性能源效益標籤計劃。中小企及物業管理公司的反應很踴躍，總共有超過1,000名人士出席以上網上講座。



網上講座的宣傳單張
Leaflet of virtual seminars

政府與非政府機構和商界緊密合作，推廣全民節能，同為環保作出承擔。

有關以上網上講座的題目的更多資訊，可瀏覽專題網頁：

<https://www.energysaving.gov.hk/esc2022>

<https://re.emsd.gov.hk>

<https://eui.emsd.gov.hk>

<https://www.rcxrc.emsd.gov.hk>

<https://www.emsd.gov.hk/energylabel/>

最後，作為地球村的一份子，我們期望藉著社會各界繼續積極參與節能減碳，為香港締造一個健康、宜居及可持續發展的環境。

The HKSARG has all along been attaching great importance to climate change. In response to the Paris Agreement, the Government presented Hong Kong's Climate Action Plan 2030+ in 2017. The Government launched Hong Kong's Climate Action Plan 2050 on 8 October 2021, setting out the vision of Zero-carbon Emissions Liveable City Sustainable Development and outlining the four major decarbonisation strategies and measures, namely net-zero electricity generation, energy saving and green buildings, green transport and waste reduction for combating climate change and achieving carbon neutrality. EMSD adopts a multi-pronged approach to encourage buildings to achieving better energy performance and management, including regulatory services and promotion to trade and general public.

Four virtual seminars on EE&C and RE “Path to achieve Carbon Neutrality” for SME and Property Management Companies were held on 4 & 24 Aug and 7 & 21 Sept 2022. The webinars delivered six EE&C and RC topics, including six topics, namely Carbon Neutrality, Energy Saving Charter 2022 & 4T Charter, Renewable Energy-Feed-in Tariff Scheme, Online Building Based Electricity Utilization Index Benchmarking Tool (Online Benchmarking Tool), Retro-commissioning (RCx) Programming and Case Sharing, and Mandatory Energy Efficiency Labelling Scheme (MEELS). Overwhelming response was received from SME and Property Management Companies, and there were over 1,000 participants attended the above webinars.

A pledge for close partnership among the Government, non-governmental organisations and business sector for a community-wide campaign to save energy.

<https://www.energysaving.gov.hk/esc2022>

<https://re.emsd.gov.hk>

<https://eui.emsd.gov.hk>

<https://www.rcxrc.emsd.gov.hk>

<https://www.emsd.gov.hk/energylabel/>

Lastly, as a member of the global village, we hope that all sectors in the community will continue to actively participate in energy conservation and carbon emission reduction, and thus promoting a healthy, livable and sustainable environment for Hong Kong.

通過有效的監管和合作，提高建築物能源效益以實現碳中和目標 Enhancing Energy Performance of Buildings towards Carbon Neutrality by Regulation and Collaboration

香港的建築物佔全港用電量約90%。超過60%的碳排放來自建築物耗能相關的電力生產。因此在與建築物相關界別實踐節能是長期的基本目標。自《建築物能源效益條例》(《條例》)自2012年實施後至今已覆蓋了超過 1,900棟新建建築物，13,000項現有建築物的主要裝修工程，以及2,600份能源審核報告，成果豐碩。我們非常感謝「註冊能源效益評核人」、發展商、業主、管理公司及業界等持份者對香港長遠減碳和可持續發展的參與和承諾。

探討擴展規管範圍至更多建築物類別

為支援智慧城市發展，政府正積極推廣善用工業大廈改作數據中心和在工業用地發展高端數據中心。數據中心是高耗能建築物，但現時《條例》並未涵蓋該類別建築物，因此我們必須進一步探討擴展規管範圍至這類別建築物的可行方案。另外，我們也會探討將能源審核的範圍擴展至更多建築物類別，以進一步提升香港整體的建築物能源效益，為邁向碳中和作更大貢獻。

Hong Kong's buildings account for about 90% of the city's electricity use. Over 60% of our carbon emissions are attributable to generating electricity for our buildings. Thus, achieving energy saving in the building sectors is the primary target for the long-term. Since the implementation of the BEEO in 2012, it has covered over 1,900 new constructed buildings, 13,000 major retrofitting works of existing buildings and 2,600 energy audit reports, with fruitful results. We are very grateful to stakeholders including Registered Energy Assessors, developers, building owners, property management companies and the trade etc. on their participation and commitment for long-term decarbonisation and sustainable development in Hong Kong.

Explore to cover more building types under the Regulation

The Government has been proactively encouraging conversion of industrial buildings for data centre and use of industrial lots to develop into high-tier data centres. As data centre is a kind of high energy consumption building and the current BEEO does not cover this type of building, we must further explore feasible options to expand the regulatory scope to this type of building. In addition, we will also explore extending the scope of energy audits to more types of buildings, so as to further enhance the overall energy efficiency of buildings in Hong Kong for greater contribution towards carbon neutrality.



■ 機電工程署舉辦並參與不同的講座、研討會，以推廣建築物能源效益的協作並提高業界對節能和綠色建築的認知，推動全民參與深度低碳轉型。

EMSD has organized and participated in different technical forum and symposium, to promote the collaboration on buildings energy efficiency with an aim to arouse the awareness of the trade on energy saving and green buildings and seek for full engagement of the whole community in in-depth low-carbon transformation.



要求進行更頻密的能源審核及推動實施能源管理機會

許多現有建築物，特別是舊有建築物，在改善能源效益方面有很大的潛力。現時《條例》要求商業建築物 / 綜合用途建築物的商業部分最少每10年進行一次能源審核，並必須在建築物主要入口的顯眼位置展示「能源審核表格」。為進一步提升建築物能源效益，我們將會探討要求進行更頻密的能源審核，並研究引入措施推動業主實施能源審核中找出的能源管理機會及定期校驗大型中央空調系統。我們會鼓勵業主於進行能源審核後披露更多能源相關資料以提高數據透明度，加快市場對建築物節能的參與及倡導更好的環境、社會和管治表現。我們會展開研究及進行諮詢工作，收集持份者意見，繼續朝這方向深入探討。

多方協作達至實踐推動全民節能減碳

在碳中和路上單方面的力量並不足以成事。要讓節能措施發揮更大效益，需要採取多方面的協作模式。政府透過不同的平台促成跨界別攜手合作，例如「碳中和夥伴計劃」進一步深化和加快業界低碳轉型步伐、「碳中和及可持續發展委員會」鼓勵全民參與，收集和提供對碳中和的建議以調整減碳策略。

在2050年之前實現碳中和極具挑戰性，我們將會優化《建築物能源效益條例》，不斷檢討建築物能源效益標準和繼續推動多方協作，期望可以帶來創新和突破。我們呼籲社會各界與政府攜手共建綠色香港，一起邁向碳中和。

Require for more frequent energy audits and to promote the implementation of identified EMO.

There are numbers of existing buildings, particularly older buildings, have great potentials to perform better on energy efficiency. The current BEEO requires commercial buildings /portion of a composite building that is for commercial use to conduct energy audits at least once every 10 years, and must display the energy audit form in a conspicuous position at the main entrance of the building. To further enhance buildings energy efficiency, we will explore requiring more frequent energy audits, and study the introduction of measures to encourage building owners to implement EMOs identified in energy audits and regular commission large central air-conditioning systems. We will encourage building owners to disclose more energy-related data to improve data transparency, whereas to accelerate market participation in buildings energy efficiency and advocate better environmental, social and governance (ESG) performance. We will embark on the study and conduct consultation to gauge opinions of stakeholders as we continue our exploration in this direction.

Collaboration with "Decarbonisation for All"

Along the decarbonisation journey, sole-effort of single party is not enough. To make energy-saving measures more effective, a multi-faceted collaborative model is required. The government promotes cross-sector cooperation through different platforms, such as the "Carbon Neutral Partnership Program" to further deepen and accelerate the pace of low-carbon transformation in the industry, and the Council for Carbon Neutrality and Sustainable Development encourages public participation, collects and provides suggestions on carbon neutrality to adjust carbon reduction strategies.

Achieving carbon neutrality before 2050 is extremely challenging. We will enhance the BEEO, constantly review buildings energy efficiency standards and continue to promote collaboration to bring innovations and breakthroughs. We call on all sectors of the society to join hands with the Government to build a green Hong Kong and move towards carbon neutrality.

採電學社小學教材套 Solar Harvest Educational Kits for Primary Schools



學生按照教材套的其中一個「動手動腦活動」，成功砌成太陽能小車，並於學校操場進行測試

With aids of one of the hands-on activities from the educational kits, students can assemble the Solar Cars and test them in the school playground.

機電工程署在2019年推出「採電學社」，為學校和非政府福利機構免費安裝太陽能發電系統，並與環境及生態局和教育局合作，編制了一套合共有8個主題的小學教材套，以豐富小學的教學資源和配合STEAM (科學、科技、工程、藝術和數學)教育。

教材套旨在透過互動學習，幫助學生認識可再生能源，並激發他們對潔淨能源與低碳生活的興趣。我們已於2021/22學年完成製作教材套，學校在2022/23學年即可使用。

教材套分兩部分，分別供初小和高小使用。兩者均有教師專用材料、學生專用材料、工作紙、學校需要購置用於STEAM活動的材料清單、常見問題及教學影片。教材套內容深入淺出，充滿互動元素。課程每個階段均設有「動手動腦活動」，讓學生在學習相關理論後，製作以太陽能發電的小手作。學生亦會在機電署吉祥物的帶領下，透過虛擬實境參觀太陽能發電設施。老師可因應學生的程度和教學進度，靈活使用這份高質素、獲認可的教材套授課，無須另覓教材。

The Electrical and Mechanical Services Department (EMSD) launched the Solar Harvest in 2019 and helps install solar energy generation systems for schools and non-governmental welfare organisations for free. To enrich the teaching resources and support Science, Technology, Engineering, Arts and Mathematics (STEAM) education in primary schools, EMSD, in collaboration with the Environment and Ecology Bureau (EEB) and the Education Bureau (EDB), develop a set of educational kits with a total of 8 themes for primary schools.

With its production completed in 2021/22 for schools to use in the 2022/23 academic year, the kit aims to help students better understand renewable energy through interactive learning and inspire their interest in clean energy and a low-carbon lifestyle.

The kit comes in two sets separately for junior and senior primary school levels. Each set comprises materials designed for teachers and students respectively, worksheets, a list of materials to be procured by schools for STEAM activities, frequently asked questions and



學生可使用虛擬實境眼鏡（左圖）或平板電腦（右圖）進入學習平台，以學習能源效益知識

Students can view energy efficiency knowledge in the learning platform through Virtual Reality Cardboard (left) or tablet (right).

小學老師可瀏覽機電署的「採電學社」網頁，以取得教材套。而參加了「採電學社」並成功將太陽能發電系統成功接駁上電網的學校更可以在教材套設有的虛擬實境學習平台進入實時監測系統，讓學生可以即時瀏覽校內太陽能發電系統所生產的電力資料。引入這教材套，為香港的可再生能源教育揭開新一頁。

機電署現已開始為中學編製「採電學社」教材套，初中和高中程度會有不同內容，以配合初中科學科及高中物理科課程，並會加入更多技術性資料，以配合中學生的程度。



可掃描二維碼瀏覽機電署的「採電學社」網頁以取得教材套

Browsing the EMSD webpage on Solar Harvest to access the educational kit by scanning the QR code.

educational videos. The content is easy to understand and full of interactive elements. At every stage of the curriculum, there are hands-on activities for students to make solar-powered handicrafts after learning the relevant theories. Guided by the EMSD mascots, students will also be taken on virtual reality tours of solar energy generation facilities. Teachers can flexibly use this high-quality and recognized educational kit for teaching based on students' level and teaching progress, without having to search other teaching materials.

Primary school teachers may browse the EMSD webpage on Solar Harvest to access the educational kit. Schools participating in Solar Harvest with solar energy generation systems connected on-grid can access the Real-time Monitoring System through the Virtual Reality learning platform such that students can browse the electricity generated by schools' solar energy generation systems simultaneously. The introduction of the educational kit will create a new chapter of RE education in Hong Kong.

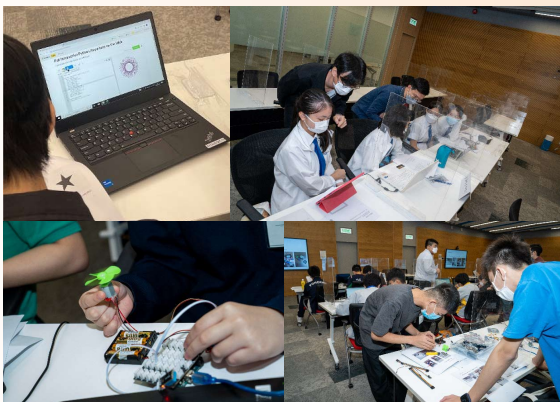
EMSD has commenced the compilation of Solar Harvest Educational Kit for secondary schools, with separate contents to align with the Science and Physics curricula for junior and senior secondary levels respectively. More technical information will be included in the kit to suit the level of secondary students.

區域供冷系統STEM工作坊及比賽 STEM Workshop and Competition for District Cooling System



在2022年10月舉辦的「區域供冷系統STEM工作坊及比賽」，時任總工程師/能源效益C馮子峯先生(前排左四)、時任高級工程師/能源效益C7盧潔瑩女士(後排左三)及能源學會(香港分會)主席莊偉泉工程師(前排右五)與一眾參與學生在其中一場工作坊合照

For the STEM Workshops and Competition for District Cooling System in October 2022, Mr. Fung Chi-fung (front row, fourth left, the then Chief Engineer/Energy Efficiency C), Ms. Lo Kit-ying Denise (back row, third left, the then Senior Engineer/ Energy Efficiency C7), Mr. Chris Chong (front row, Fifth right, Chairman of Energy Institute Hong Kong) took photos with participating students in one of the workshops



參與學生學習編碼及在STEM器材上執行編碼指引情況
Participating students learning coding and executing instructions on the STEM device



馮子峯先生(左)頒發感謝狀予香港城市大學能源及環境學院教授梁國熙教授工程師(右)

Mr. FUNG Chi-fung (Left) presented the Certificate of Appreciation to Prof. Michael Leung, Professor of School of Energy and Environment City University of Hong Kong (Right)



馮子峯先生(左)頒發感謝狀予能源學會(香港分會)主席莊偉泉工程師(右)

Mr. FUNG Chi-fung (Left) presented the Certificate of Appreciation to Mr. Chris Chong, Chairman of Energy Institute Hong Kong (Right)

區域供冷系統 (DCS) 是一個非常節能的大型中央空調系統，可製造和提供冷卻水給地區內不同類型建築物。在2019年區域供冷系統更被城市氣候領導聯盟(C40)表揚，並成功被列為100個氣候行動方案之一。行政長官在2022年的施政報告中宣佈，政府將加快在新發展區（包括北部都會區）興建區域供冷系統，以減少能源消耗，支援對低碳發展的承諾，促進環保和實現可持續發展。

我們舉辦是次活動，目的是希望中學生透過融入STEM工作坊及比賽，加深對DCS作為綠色基建的認識和興趣，並讓他們了解DCS對碳中和的貢獻，以及其在應對和解決氣候變化中的重要角色。該活動還旨在激發學生對工程、創新和科技的興趣，希望能培養出新一代的工程師。活動對象分別涵蓋沒有及有少量編程經驗的中學生，使不同程度的學生能參與其中，學習相關工程知識、基本的Python編程、人工智能的應用等，製作與DCS相關的資訊圖，並使用編碼控制冷卻系統裝置（如微型泵葉輪）以模擬DCS機

A District Cooling System (DCS) is a very energy-efficient large scale centralised air conditioning system that generates and provides chilled water to different types of buildings in a district. It is recognised by the C40 Cities Climate Leadership Group (C40) in 2019 and featured as one of the 100 solutions for climate actions. The Chief Executive announced in his 2022 Policy Address that the Government would accelerate the incorporation of district cooling systems in New Development Areas (NDAs) including the Northern Metropolis to reduce energy consumption, support the commitment to low carbon development, promote environmental protection and achieve sustainable development.

Through the STEM workshops and competitions (hereinafter the event), secondary students could deepen their knowledge and raise their interest in DCS as a green



■ 總工程師/能源效益C江茂誠先生在比賽簡介會致歡迎辭

Welcome remarks of Competition Briefing by Mr Kong Mau-shing, Chief Engineer/ Energy Efficiency C



■ 機電工程署副署長/規管服務潘國英先生（右六），機電工程署助理署長/電力及能源效益朱祺明先生（右三），機電工程署總工程師/能源效益C江茂誠先生（右二），機電工程署高級工程師/能源效益C7何志明先生（左一）及評審委員會主席梁廣灝工程師, SBS, OBE, JP（左5），香港工程師學會屋宇裝備分部委員周子俊工程師（左二），香港綠色建築議會可持續發展委員會副主席邱萬鴻博士（左三），香港科技創新教育聯盟理事黃仲翹博士（左四），香港城市大學能源及環境學院教授梁國熙教授工程師（右五），能源學會(香港分會)主席莊偉泉工程師（右四），一眾嘉賓在評審會議中合照。

Mr. Poon Kwok-ying (sixth right, Deputy Director/Regulatory Services), Mr Chu Kei-ming (third right, Assistant Director/Electricity and Energy Efficiency), Mr Kong Mau-shing (second right, Chief Engineer/ Energy Efficiency C), Mr. Ho Chi-ming (first left, Senior Engineer/ Energy Efficiency C7), Ir Edmund KH Leung, SBS, OBE, JP (fifth left, Judging Panel Chairman), Ir Kevin Chow (second left, Committee Member of HKIE-Building Services Division), Dr Raymond Yau Man-hung (third left, Vice Chairman of Sustainable Development Committee of Hong Kong Green Building Council), Dr C.K. Wong, MH (Fourth left, Committee Memebr of Hong Kong STEM Education Alliance), Ir Prof. Michael Leung (fifth right, Professor of School of Energy and Environment of City University of Hong Kong), Ir Chris Chong (fourth right, Chairman of Energy Institute Hong Kong) at the judging panel meeting.

房的內部運作。工作坊有學術界和業界代表、年青工程師以及STEM導師分享和參與。活動得到熱烈的響應，我們在2022年10月舉行了多場工作坊，並在11月開始舉行比賽，在各界支持下，頒獎典禮將於2023年3月舉行。

有關「區域供冷系統STEM工作坊及比賽」活動的詳情和更多資訊，可瀏覽以下活動網站：

<https://www.energysaving.gov.hk/dcscompetition/tc/gallery/index.html>



infrastructure to promote its contribution towards carbon neutrality and its role in combating and tackling climate change. The event also aimed to inspire students' passion towards engineering, innovation and technology to nourish the new generation to be engineers. The target participants included both secondary students without programming background and those with a slight programming background. Students of different levels can participate in the event, learn the engineering knowledge together with basic Python coding and application of artificial intelligence etc., produce DCS-related infographics, control simple cooling devices (e.g. mini pump impellers) by coding to simulate the internal operation of DCS plant. We have academic and trade representatives, our young engineers and STEM tutors to share and take part in the workshops. The event received an overwhelming response. All the STEM workshops and competition were successfully conducted in Q4 2022. The award ceremony will be held in Mar 2023 with the support of various trade representatives and stakeholders.

For details of the STEM Workshop and Competition, please visit the event website:

<https://www.energysaving.gov.hk/dcscompetition/tc/gallery/index.html>



於區域供冷系統工程項目採用新工程合約第四版合約模式 Adoption of NEC 4 contract form in district cooling system (DCS) projects

為配合發展局致力透過採用新工程合約模式，推動以夥伴的方式去履行工務工程合約，機電工程署在東涌東新發展區的區域供冷工程項目中，採用新工程合約第四版的標準，進行「設計、建造及營運」合約的招標。

新工程合約第四版是嶄新的工程合約模式。在此模式下，工程合約雙方，包括政府部門和承建商，均需要依照新工程合約條款訂明的要求，採用夥伴模式管理工程。由於此合約模式要求工程雙方人員建立良好的互助互信夥伴關係，從而減少不必要的工程紛爭，令工程減少延誤。此外，機電工程署亦積極於區域供冷系統的顧問研究合約中採用新工程合約，例如已於2021年尾批出洪水橋/廈村新發展區的區域供冷系統第一期第一階段的顧問合約。

此外，機電工程署從2021年開始已與英國土木工程師學會合作，為機電署人員安排新工程合約第四版相關認證課程，以配合日後在各項區域供冷系統工程中採用新工程合約第四版的合約模式。

區域供冷系統是邁向2050年前達致碳中和目標的其中一項重要措施之一，機電工程署會繼續積極於未來相關項目的顧問合約及工務工程合約，採用新合約工程的合約模式，藉此增加工程效率、提高設計和工程質素及降低成本。

By adoption of the New Engineering Contract ("NEC") to foster the partnering approach in public works contracts as promoted by the Development Bureau, the EMSD has applied the "Design-Build-Operate" under NEC 4 contract form in the DCS projects for Tung Chung New Town Extension and Kwu Tung North.

NEC4 is a new contract form for construction projects. Under this contract form, all contracting parties including the government department and the contractor, need to follow the contract conditions under the NEC4 and manage the project in a partnering manner. Through the implementation of contractual partnering, project stakeholders build up a high level of mutual trust and collaboration of risk management to minimise contractual disputes and reduce chance of delay. Besides, the EMSD has been actively promoting the implementation of NEC form in consultancy agreements. For example, the consultancy agreement for the DCS at Hung Shui Kiu / Ha Tsuen New Development Area (Phase 1, Stage 1) was awarded in late 2021.

Starting from 2021, the EMSD have collaborated with the UK Institution of Civil Engineers to provide NEC4 accreditation courses for the EMSD staff with a view to using NEC4 contract form for all upcoming DCS projects.

DCS projects as one of the key measures to achieve the goal of carbon neutrality before 2050, the EMSD will step up the efforts in implementation of the NEC form in upcoming consultancy agreements and public works contracts to enhance project efficiency, elevate the quality of design and construction as well as lower the costs.

實時水質監控水處理系統應用在淡水冷卻塔

Application of the automatic Real Time Monitoring and Water Treatment System for Fresh Water Cooling Towers

能源效益事務處最近積極推廣「實時水質監控水處理系統」應用在淡水冷卻塔中。過往傳統的化學劑投放方式，會使用定時定量地自動投放化學劑在淡水冷卻塔水裏，常見的化學劑包括殺菌劑、防垢劑和防蝕劑等，現在只要透過先進的物聯網傳感器和實時監控系統，便可全天候監控水質及自動化投放，配合智慧控制投藥系統，根據即時水質指標的資料，精準地控制化學劑量和投放的時間，減少浪費化學劑，除此以外，水質資料更可實時地上傳至互聯網，讓相關人士第一時間收到通知，並透過手提電話隨時隨地監控水質，節省視察時間，使淡水冷卻塔系統日常操作更可靠。

The Energy Efficiency Office is actively promoting "the Real Time Monitoring Water Treatment System" (RTMWTS) for Fresh Water Cooling Towers (FWCTs) recently. In the past, common traditional dosing method is using timer for dosing chemicals into the FWCT water with regular dosing intervals for biocide, scale inhibitor and corrosion inhibitors. Now, with the advanced Internet on Thing (IoT) sensors and RTMWTS, the FWCT water quality could be more accurately monitored and controlled. Since the intelligent control of the RTMWTS, the dosing rate of chemical quantity could be precisely controlled by the real time detection of the water quality for reduction of chemical wastage. In addition, the water quality data could be uploaded to the Internet in real time. The relevant parties could be instantly notified and the water quality could also be remotely monitored anytime through mobile phone so as to save time for site inspection and to enhance the reliability in day-to-day operation of FWCT system.



國際環保博覽2022 Eco Expo Asia 2022



- 環境及生態局局長 謝展寰先生（前排右二）、副局長 黃淑嫻女士（前排左二）、常任秘書長（環境）謝小華女士（前排左三）與機電工程署副署長/規管服務 潘國英先生（前排右一）、助理署長/電力及能源效益 朱祺明先生（後排右一）與一眾機電工程署代表及機智啤啤拍照留念。

Mr. TSE Chin-wan, BBS, JP, Secretary for Environment and Ecology (Front, second from right), Miss Diane WONG Shuk-han, JP, Under Secretary for Environment and Ecology (Front, second from left), Miss TSE Siu-wa, Janice, JP, Permanent Secretary for Env & Ecology (Env) / Dir of Env Protection (Front, third from left), representatives from EMSD and Witty Bear, EMSD's promotion ambassador at EMSD's booth of Eco Expo Asia 2022

第十七屆國際環保博覽2022已於十二月十四日至十七日在香港會議展覽中心順利舉行。機電工程署亦應邀到現場設置展覽攤位，向業界及市民分享及推廣本署在對能源效益及節能的相關工作及成效，當中包括《強制性能源效益標籤計劃》、《建築物能源效益條例》、《重新校驗》、《區域供冷系統》、《綠色校園2.0 - 智慧校園》、《綠色社福機構》、《採電學社》、《香港太陽輻照圖》、《試行氫燃料電池雙層巴士及重型車輛》、《海上液化天然氣接收站》及其他創新節能科技等。

為期四天的博覽會吸引眾多業界人士及公眾參與，環境及生態局局長 謝展寰先生以及一眾嘉賓於展覽開幕當日更親臨現場參觀本署展覽攤位，並由能源效益事務處的同事介

The 17th Eco Expo Asia 2022 was successfully held at the Hong Kong Convention and Exhibition Center from December 14th to 17th. The Electrical and Mechanical Services Department (EMSD) was invited to set up an exhibition booth to share and promote the Department's effort to the trade and the general public on energy efficiency and energy conservation and the related works, including the "Compulsory Energy Efficiency Labelling Scheme", "Buildings Energy Efficiency Ordinance", "Retro-commissioning", "District Cooling System", "Green School 2.0 — Energy Smart", "Green Welfare NGOs", "Solar Harvest", "Hong Kong Solar Irradiation Map", "Testing Out Hydrogen Fuel Cell Electric Double-deckers



機電工程署署長 彭耀雄先生(右一)、副署長/規管服務 潘國英先生(右三)、助理署長/電力及能源效益 朱祺明先生(右二)及能源效益事務處同事與機智啤啤一起“撐碳中和”。

Mr. Eric PANG, Director (first from right), Mr. Raymond POON, Deputy Director/Regulatory Services (third from left), Mr. Barry CHU, Assistant Director/Electricity and Energy Efficiency (Second from right), colleagues of Energy Efficiency Office and Witty Bear of EMSD support on carbon neutrality.

紹展覽內容。署長 彭耀雄先生、副署長/規管服務 潘國英先生及助理署長/電力及能源效益 朱祺明先生亦親力親為，聯同擔任宣傳大使的機智啤啤，到現場為我們的展覽團隊打氣。環保博覽的最後一天是「公眾日」，當天攤位開放予公眾人士免費入場，更有學校帶同學生到機電署的攤位參觀及了解本署對能源效益及節能的工作。

「公眾日」當日有不少學生到機電署的攤位參觀，並樂在其中在攤位前踴躍拍照。

School students learn about EMSD works on energy efficiency and energy conservation and take group photo at EMSD's booth.

and Heavy Vehicles", "Offshore LNG Terminal" and other innovative energy-saving technologies, etc.

The four-day expo had caught numerous eyes from the trade and the public. On the opening day of the exhibition, Mr. TSE Chin-wan, BSS, JP, the Secretary for the Environment and Ecology together with other guests, visited our exhibition booths and was greeted by EMSD's colleagues from the Energy Efficiency Office to showcase the exhibition contents. Mr. Eric PANG, Director, Mr. Raymond POON, Deputy Director/Regulatory Services and Mr. Barry CHU, Assistant Director/Electricity and Energy Efficiency of EMSD, together with Witty Bear as the promotion ambassador, also visited the Expo and showed support to the EMSD's exhibition team. The last day of the Expo was a "Public Day" during when the Expo was opened to the public for free and some school students came and learnt the Department's works on energy efficiency and energy conservation.