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## 頭條報道 *Headline*

### Smart Building Technologies for Enhancing Operational and Energy Efficiency

from ATAL Engineering Ltd

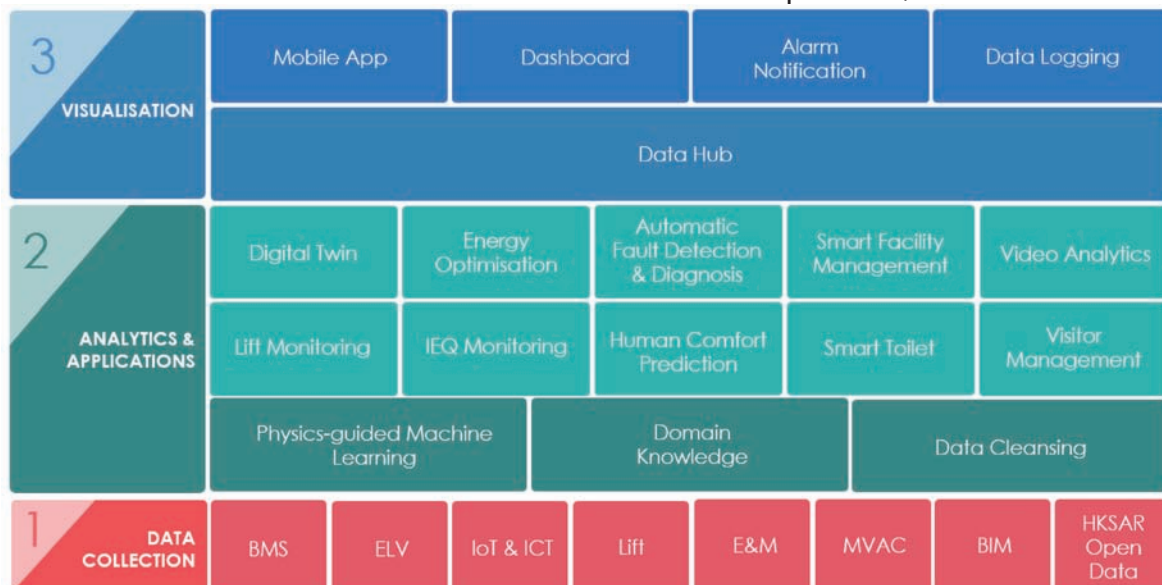
The explosive growth in technological advances is leading us into a new era of building management. The digitisation transformation of building control has been happening at a rapid pace. Today's smart buildings have begun leveraging IoT technologies to connect various systems, sensors, and devices to a cloud-based smart building platform. Building operational data generated from various building systems and sensors at one building can be more than billions of data per year. By integrating data, analytics techniques, machine learning and artificial intelligence (AI), smart applications for different purposes can be built upon the platform which proactively enhance operation efficiency and optimise energy consumption for building services

systems. The analytics architecture applying in the smart building platform is a framework of three layers including data collection, analytics & applications, and visualisation. In line with the Smart City vision of the HKSAR Government, making use of innovation and technology in the built environment is the key to achieving smart buildings across Hong Kong. Smart buildings go way beyond saving energy and sustainability. Businesses that adopt technologies are leveraging data in new ways to achieve a new level of efficiency. The success in smart buildings brought by innovative technologies is not temporary but rather represents a continuing effort to lead the way in developing smart cities. Smart buildings are a key component of urban evolution towards a truly intelligent world.

#### 1. IoT CONNECTIVITY

Data is changing and reflecting building performance constantly. Examples of big data within a built environment include data from HVAC systems, lighting, and security systems, as well as many other building services. Such data is normally not available in existing buildings where the BMS provision is very primitive. However, collection of big data is becoming easier as technology advances. With wireless IoT sensors, installation works can be done without fixed infrastructure and therefore, implementation and maintenance cost can be minimised. Real-time operation, environmental and energy data can be

easily obtained through different IoT sensors and connected devices via an IoT network. An IoT connectivity known as LPWAN (low-power wide-area networks) is designed to allow long range communications at a low bit rate among devices relying on the star network topology and modulation technique. LPWAN technology works well



Graph 1: System architecture of smart building platform

# 頭條報道 *Headline*

## Smart Building Technologies for Enhancing Operational and Energy Efficiency

in the built environment where IoT sensors can transmit small data inside / outside premises. Big data collected from wireless IoT sensors can be sent to a cloud platform through the IoT network in real-time for further processing and analysis.

### 2. ANALYTICS AND APPLICATIONS

Advanced analytics accompanied by efficient data cleansing eliminates inaccurate, incomplete, inconsistent, and repetitive data in avoidance of misleading conclusions. Abnormal and noisy data is eliminated to ensure data quality. Subsequently, the processed data can be put in use for the development of a various scopes of analytic applications –

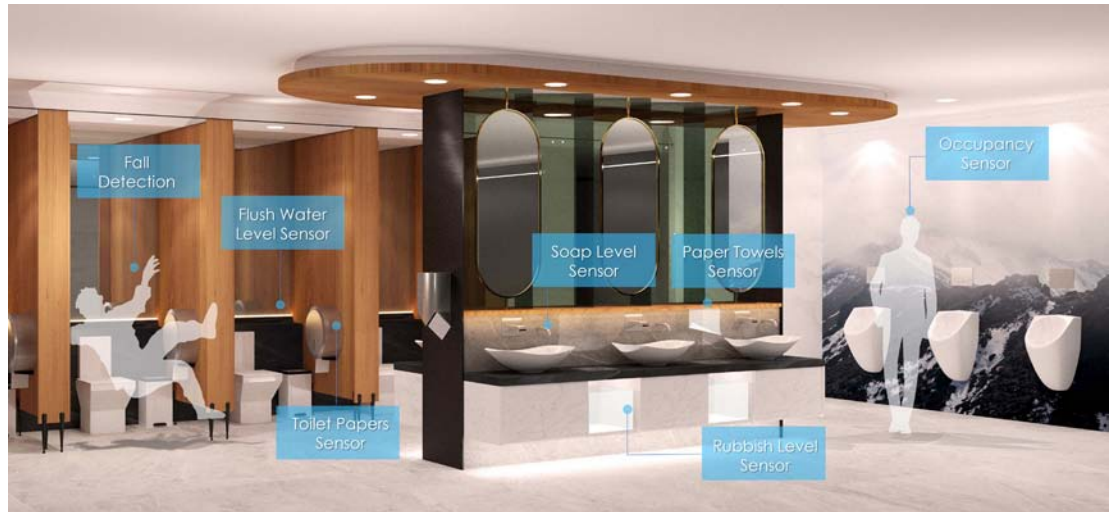
#### 2.1 Video Analytics

With AI-based video analytics, large volumes of unstructured video data collected from multiple targeted locations can be transformed into intelligence and actionable insights. It covers a wide range of applications beyond crime prevention and accident management. By leveraging video analytics technologies, customer demographics and their shopping behaviours can be captured for further analysis in real-time. The function of crowd detection monitors occupancy levels within a given space, triggering alarms when exceeding allowed number of people. The advanced people tracking function, which utilises facial recognition technology, can detect movement of people in both indoor and outdoor environments while instantly identifying and verifying authorised personnel by facial attributes. The left object detection feature identifies the presence of unattended static objects. Real-time notifications and alarms are generated for security staff to provide responsive actions. Video analytics is ideal for places with high traffic and population density to ensure crowd security, engage shoppers and enhance operation efficiency.

#### 2.2 Smart Washroom

Incorporating IoT technologies at washrooms can empower facilities managers making evidence-based decisions to maintain high level of hygiene and cleanliness in prevention of spreading coronavirus

and different kinds of disease. Real-time foot traffic data can be monitored for better management of washroom usage by diverting toilet users to vacant washrooms, shortening queue times and increasing overall efficiency. Reliable level detection assesses accurate level data from containers of the washroom



Graph 2: IoT sensors installed at washrooms

consumables which enables enhanced facility management for timely replenishment and effective inventory management. Automatic fall detection can alert facility management personnel of emergencies to ensure user safety. Any odour (i.e., ammonia) or smoke (smoke particles) build-up can be promptly detected for quick improvement of indoor air quality. Control settings of toilet facilities (i.e., ventilation system, air-conditioner, air-filtering, and lighting etc.) can be adjusted according to the changing conditions in washrooms, creating the best possible ambience at minimum power consumption.



Graph 3: Smart washroom's interface facilities management



Graph 4: Smart washroom's interfae for washroom user



## Smart Building Technologies for Enhancing Operational and Energy Efficiency

### 2.3 Indoor Environmental Quality (IEQ) Analytics

Incorporating big data analytics into measuring IEQ helps achieve healthier workplaces. This approach can identify critical factors in the physical environment that impacts building occupant comfort and satisfaction. The key factors that have the greatest impact on office workers' health and comfort include air quality (i.e., CO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, PM<sub>1.0</sub>, formaldehydes), thermal quality (i.e., air temperature, relative humidity), lighting quality (i.e., light/daylight level), acoustic quality (i.e., ambient noise level), and spatial quality (i.e., occupancy level). The recorded data can be used to train an ML algorithm for automatically classifying the level of tenant comfort and satisfaction, necessary adjustments of redefining user comfort thresholds can therefore be made based on real-time analytics. The captured data shown in the cloud-based analytics dashboard continuously provides actionable insight for easy identification of issues and opportunities for optimising tenant comfort.

## 3. DATA VISUALISATION

Advanced visualisation integrated with big data analytics enables users to interact with the relevant data, allowing them to see a summary of big pictures and intricate details at the same time. A picture is worth a thousand words while a visual is worth thousands of datasets. With machine learning, discovering hidden patterns in data helps users instantly gain deeper insights of energy-saving opportunities



Graph 5: Data Visualisation

### 3.1 Digital twin

Before going into details, it is important not to confuse Building Information Modelling (BIM) with Digital Twin Technology. BIM is designed to

enable real-time collaboration and visualisation during design and construction, not operation and maintenance. On the contrary, the intent of digital twin is to manage buildings' daily operation. Every data collected by sensors and devices is fed to the digital twin for information modelling to create a live digital model of a physical building. Replacing design data / assumptions, the operational model updates and responds in real-time to reflect the actual performance of each building system. Facility managers can gain insights on the current state of the building performance and make evidence-based decisions in adjusting the control settings to optimise building performance.

### 3.2 Virtual reality and augmented reality

Maintaining hidden and hard-to-access system components has always been a challenge for facility management. Incorporating the data from BIM and digital twin, the three-dimensional renderings of facilities create realistic scenarios of internal design with detailed information for each piece of equipment, providing immediate access to all the user manuals, training materials, and maintenance history.



Graph 6: Digital Twin

## 4. CONCLUSION

The architecture of applying big data analytics in buildings can be broadly categorised into three components. IoT network is the fundamental element that can enable efficient data collection from numerous sources. By applying big data analytics techniques, data can be analysed and adopted in the areas of energy saving, facility management, security, and health & safety, streamlining operation and building performance. The results of data analytics can be easily interpreted through interactive visualisation in real-time for identifying patterns and exploring business insights. Advanced technologies are reshaping the ways we operate in the built environment. We should be prepared ourselves and leverage big data analytics to enhance building performance.

## 恭賀盈電工程有限公司

### Congratulations to REC Engineering Company Limited

本會恭賀盈電工程有限公司中標於東涌第99區公營房屋發展計劃建築工程的電力裝置工程，並祝順利如期完成。

On Behalf of Hong Kong Electrical Contractors' Association, we would like to convey our congratulations to **REC Engineering Company Limited** for the Electrical Installation for Construction of Public Housing Development at Tung Chung Area 99 (Sub-contract to Contract No. 20200468).



## 恭賀柏高工程有限公司

### Congratulations to Pekko Engineers Limited

本會恭賀柏高工程有限公司中標於曉明街公營房屋發展計劃建築工程的電力裝置工程，並祝順利如期完成。

On Behalf of Hong Kong Electrical Contractors' Association, we would like to convey our congratulations to **Pekko Engineers Limited** for the Electrical Installation for Construction of Public Housing Development at Hiu Ming Street (Sub-contract to Contract No. 20170567).

## 恭賀三馬工程有限公司 Congratulations to Samba Engineering Limited

本會恭賀三馬工程有限公司中標於上水第4區及第30區2號地盤第二期公營房屋發展計劃建築工程和青康路北第三期行人天橋工程的電力裝置工程，並祝順利如期完成。

On Behalf of Hong Kong Electrical Contractors' Association, we would like to convey our congratulations to **Samba Engineering Limited** for the Electrical Installation for Construction of Public Housing Development at Sheung Shui Areas 4 and 30 Site 2 Phase 2 and Footbridge Works at Ching Hong Road North Phase 3 (Sub-contract to Contract No. 20210070).



## 恭賀泓發工程有限公司 Congratulations to Steadfast Engineering Limited

本會恭賀泓發工程有限公司中標於上水第4區及第30區1號地盤第一期公營房屋發展計劃建築工程的電力裝置工程，並祝順利如期完成。

On Behalf of Hong Kong Electrical Contractors' Association, we would like to convey our congratulations to **Steadfast Engineering Limited** for the Electrical Installation for Construction of Public Housing Development at Sheung Shui Areas 4 and 30 Site 1 Phase 1 (Sub-contract to Contract No. 20210259).



## 香港房屋委員會 招標公告

香港房屋委員會招標公告可在以下網頁查看：  
<http://www.housingauthority.gov.hk/en/business-partnerships/tenders/>

## 商會活動 Organised Activities

### 組裝合成建築法(MiC)及機電設備合成技術(MiMEP)廠房參觀

#### MiC and MiMEP Factory Visit

組裝合成建築法(MiC)及機電設備合成技術(MiMEP)廠房參觀，已於2022年5月28日(星期六)位於元朗八鄉之廠房舉行第二場參觀，在此多謝新鷹預製件有限公司安排。內容包括：參觀預製件廠，了解工場設備製作程式及成品配送過程。為使會員對此兩項技術加深了解。MiC and MiMEP Factory Second Visit was held on 28 May 2022 (Sat) at Pat Heung in Yuen Long. We would like to express our appreciation to Sun Ying Prefab Products Ltd.



## 機電業博覽2022 - 「機電新旅程」 Electrical and Mechanical Expo 2022 - Light up Eco City Walk with ME

「機電業博覽2022」是「教育及職業博覽2022」的一部分，已於2022年7月21日至24日(星期四至星期日)在香港會議展覽中心展覽廳舉行。機電工程署聯同香港機電業推廣工作小組在「機電業博覽2022」舉辦「機電新旅程」主題日及講座，由機電業界代表向參觀人士介紹機電業的工作範疇、就業前景、晉升機會、培訓和進修資訊。

The Education & Careers Expo 2022, the E&M Expo 2022 was held on 21 to 24 July 2022 (Thur to Sun) at the Hong Kong Convention and Exhibition Centre. The Electrical and Mechanical Services Department (EMSD) and the Hong Kong Electrical and Mechanical Trade Promotion Working





## 商會活動 Organised Activities

Group jointly held the "Light Up Eco-City, Walk With Me" Theme Day and a series of seminars at the Electrical and Mechanical (E&M) Expo 2022. Representatives of

the E&M trade introduced to visitors the scope of work, career prospects, promotion opportunities, and training and continuing education in the industry.



### 中國移動香港5G參觀 China Mobile 5G Visit

中國移動“聯創+”香港5G參觀，已於2022年8月22日(星期一)在香港科學園舉行，當中分享了：智慧建築應用、數據中心節能解決方案、智慧城市分享、創新機械人分享、無人駕駛體驗及現場展品體驗交流。  
China Mobile "Joint Innovation Plus" Hong Kong 5G Visit was held on 22 August 2022 (Mon) at the Hong Kong Science Park.



### 青年會員組 Young Member Committee

青年會員組YMC會員已於2022年6月16日(星期四)進行了晚餐會面，商討未來活動。



HKECA | HKECA | HKECA | HKECA | HKECA | HKECA





# 商會活動 Organised Activities

## 「學校起動」計劃 Project WeCan

九龍倉集團有限公司「學校起動」計劃和本會協辦職業行業講座及活動：

1. 於2022年6月8日(星期三) 在大埔佛教大光慈航中學為中五級學生舉行行業講座，由港鐵學院安排。



2. 於2022年7月15日(星期五) 在大埔佛教大光慈航中學舉行2021-2022年度畢業典禮，本會香港電器工程師商會教育基金主席于健安先生為主禮嘉賓。學校繼續設立多項獎學金，嘉許成績優秀的學生發放獎學金，以作鼓勵。



3. 於2022年7月23日(星期六) 在何文田女青年會進行共二場網上直播，教學中學生安裝插頭體驗班。



4. 於2022年7月29日(星期五) 在大埔佛教大光慈航中學進行網上直播，教學中學生安裝插頭體驗班。



5. 於2022年8月8-12日期間，Job Tasting Programme 2022 本會為推動學生的生涯規劃，更積極聯繫相關行業，為大埔佛教大光慈航中學安排學生給與暑期實習機會，拓闊視野，給予學生更多的探索機會。本會代表聘用公司為：中華聯合保險顧問有限公司、怡和機器有限公司、東昇科技有限公司。



6. 於2022年8月19日(星期五) 在尖沙咀港威酒店舉行「學校起動」計劃舉辦了夥伴感謝禮暨分享會，約50位商界及專業界別的夥伴機構代表及一所參與分享的學校代表出席。



在於「學校起動」一眾夥伴機構在新常態的支持下，透過「學校起動」計劃的聯校活動或夥伴學校的義工活動，



## 商會活動 Organised Activities

### 「學校起動」計劃 Project WeCan

繼續投放時間及資源，為學生提供不同的課外體驗。出席的夥伴機構代表均認為是次分享會提供了一個非常好的平台，令夥伴機構能交流意見及經驗。



## 即將舉辦之活動 Upcoming Activities

### 亞洲創新建築、電氣、保安科技展覽會2022 Build4Asia 2022

年度行業盛事Build4Asia將於2022年11月16日至18日（星期三至星期五）再度回歸香港會議展覽中心。本會很高興成為Build4Asia的支持機構。展覽會將繼續引領建築行業走向更環保的道路，在建築材料和自動化、監控系統、智慧城市和綠色科技等方面展示一系列創新技術。多場專業會議將匯聚香港特區政府代表、國際行業協會、市場領導及業界專才共同探討建築及保安趨勢，推動行業發展。不要錯過與行業分享市場情報及建立聯繫的機會！立即登記成為買家：<https://bit.ly/3dzqFUa>

Build4Asia 2022 - the Annual Industry Gathering is returning on 16 to 18 November 2022 (Wed to Fri) at the Hong Kong Convention and Exhibition Centre. Our Association are delighted to become the supporting organisation of Build4Asia! The exhibition will continue to lead the construction services industry towards a greener path, presenting a board range of inspiring innovations in building materials & automation, surveillance systems, smart city and green technologies etc. A series of educational programmes will bring together the HKSAR government, international industry associations, leading companies and opinion leaders to drive the industries ahead! Don't miss this opportunity to gain market intelligence and network with industry peers. Register & Mark your calendar NOW! <https://bit.ly/3dzqFUa>

### 2022電力規例研討會

#### 2022 Electricity Regulations Technical Seminar

為加強與業界溝通和提高業界的安全意識，由機電工程署聯同港九電器工程電業器材職工會、建造業議會和本會協辦的電力規例研討會，將於2022年11月22日(星期二)以網上順利舉行。With a view to strengthening communication with the industry and enhancing their safety awareness, Technical Seminar co-organized with EMSD, the Hong Kong and Kowloon Electrical Engineering & Appliances Trade Worker's Union, and the Construction Industry Council. The Seminar will be held on 22 November 2022 (Tue) by webcasting.

### 2022年度週年會慶

#### HKECA 2022 Anniversary Dinner

2022年度週年會慶，將於2022年11月25日(星期五)在香港九龍紅磡黃埔天地螢幕圈(第8期)4樓會所1號博藝會設宴舉行。HKECA 2022 Anniversary Dinner will be held on 25 November 2022 (Fri) at ClubONE Spotlight, 4/F, Screen World (Site 8), The Whampoa, Hung Hom, Kowloon, Hong Kong.

### 第25屆理事選舉

#### The 25th Term Executive Committee Election

2023年至2025年 - 第25屆理事選舉將於2022年12月份舉行。

2023 to 2025 - The 25th Term Executive Committee Election will be held on December 2022.

## 會員動態 Members' News

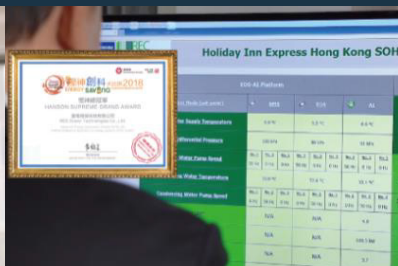
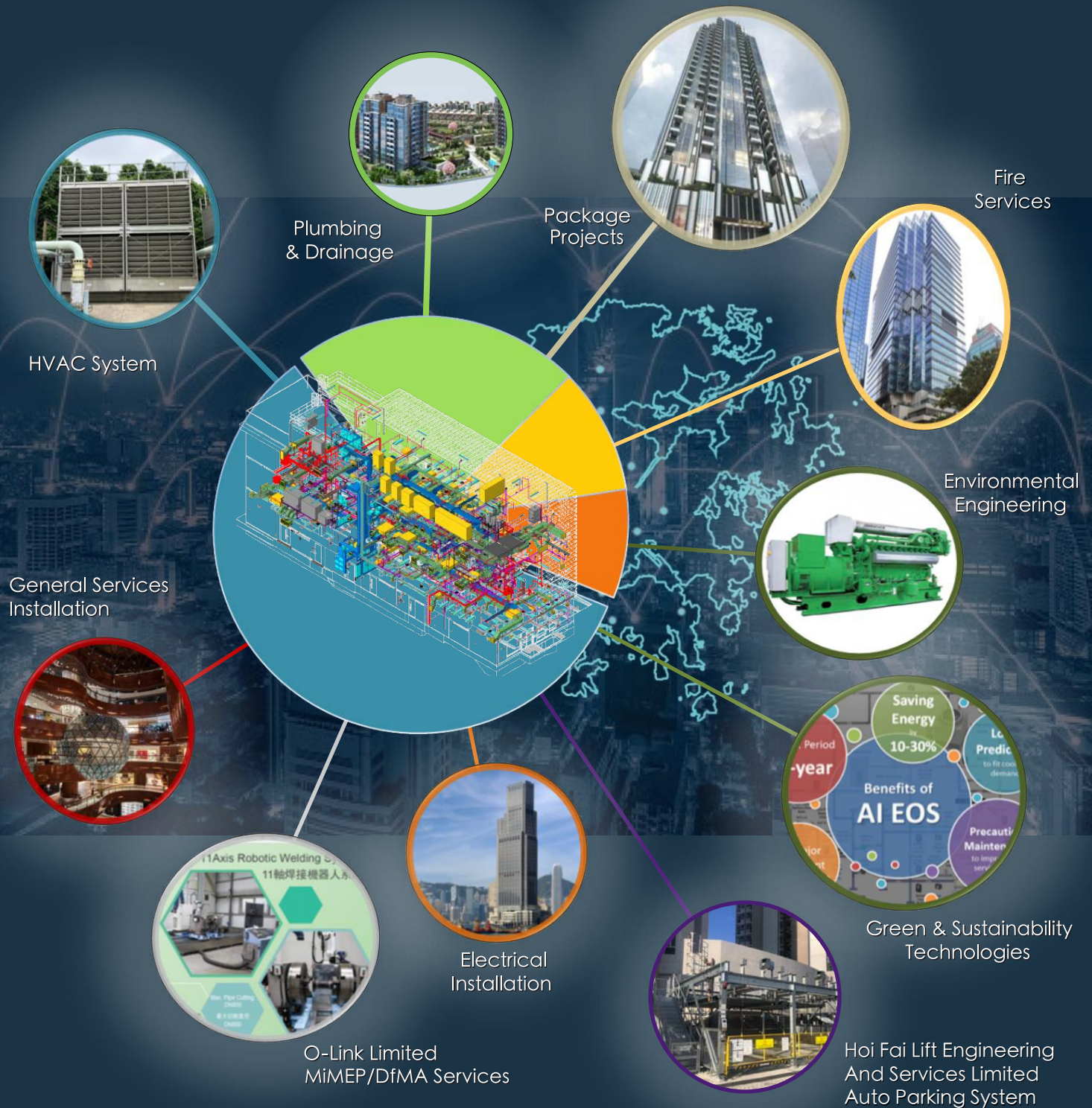
### 香港電器工程商會 5/2022 - 8/2022年度新會員名單

入會日期	申請會員名稱	會籍	代表人
Joining Date	Applicant Name	Membership Types	Representative
6/2022	ESYLUX Asia Limited	普通會員 Ordinary Member	廖培鋒先生 Mr. Liu, Pui Fung Andy
8/2022	舒麥加科技有限公司 evMega Technology Limited	普通會員 Ordinary Member	劉國東先生 Mr. Lau, Kok Tung





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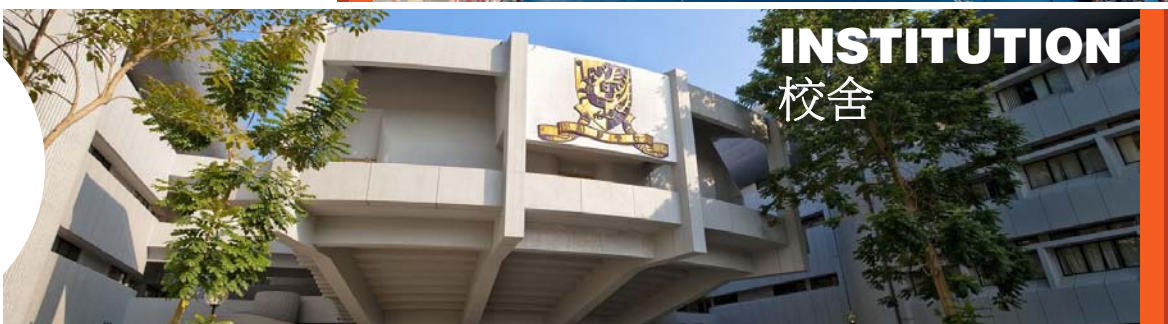
Discovery Bay  
愉景灣  
Park Signature  
溱柏  
HKHA  
房委會



HIT  
香港國際貨櫃碼頭  
COSCO HIT  
中遠國際貨櫃碼頭

**TERMINAL**  
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中文大學  
HKUST  
科技大學  
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佛教醫院



**HOSPITAL**  
醫院





# 泓發工程有限公司 STEADFAST ENGINEERING LTD



Steadfast Engineering Ltd. has been awarded for the Electrical Installation for the Construction of Public Housing Development at Sheung Shui Areas 4 & 30 Site 1 Phase 1

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