



**APAS**  
汽車科技研發中心



**hkpc**  
生產力局

# Introduction to EV & EV Charging

**By Dr Lawrence POON**

**General Manager of HKPC & APAS R&D Centre**



# Roadmap of Green Transportation – New Energy Vehicles



Green Transportation



New Energy Vehicles

- Completed
- On-going
- Future

E-Truck



Swappable Battery Minibus



AL-air Battery Truck



Fuel Cell Tractor



eDouble Decker



Commercial Vehicle

Hybrid Coach



E-Bus



Heavy Duties Vehicle

Plug-in Tractor



Special Purpose Vehicle

eGSE



# Successfully commercialized eBus

## 12METERS BATTERY ELECTRIC BUS



運輸署

Transport Department

Our Ref. : (139) in TD TKW 50/203/1 Pt.21  
Your Ref. :  
Tel. : 2189 7082  
Fax. : 2764 1517

11 September 2017

China Green Dynamics Company Limited  
46/F, China Online Centre,  
333 Lockhart Road,  
Wanchai,  
Hong Kong  
Attn.: Mr. Paul Bromley - Chief Technical Officer

Dear Sir,

Application for Type Approval

CHINA GREEN DYNAMICS GTZ6128BEVH

Pure Electric 12m Single Deck A/C Body

35 Fixed Seats + 1 Wheelchair

Further to the letter of the same series dated 6 June 2017, I am pleased to inform you that the above bus type had passed the type approval examination.

I attach herewith a Bus Type Approval Form and the approved drawing of the T.A. Plan No. CDE10CD3600 for your retention.

You may be required to recall and rectify the bus approved under this type approval if any design defect is subsequently identified. In addition, you shall also closely monitor the condition of bus.

Any subsequent variation to the type approved model on major components, systems, dimensions and layout shall be notified to the Transport Department for reference and/or reassessment.

This approval may be withdrawn if the above bus type is found to be no longer roadworthy.

Yours faithfully,

(K. W. CHAN)

for Commissioner for Transport

Passed Type Approval Exam

Sold 60+ eBuses



# The 1<sup>st</sup> in HK 16T Full Electric



**FAW**



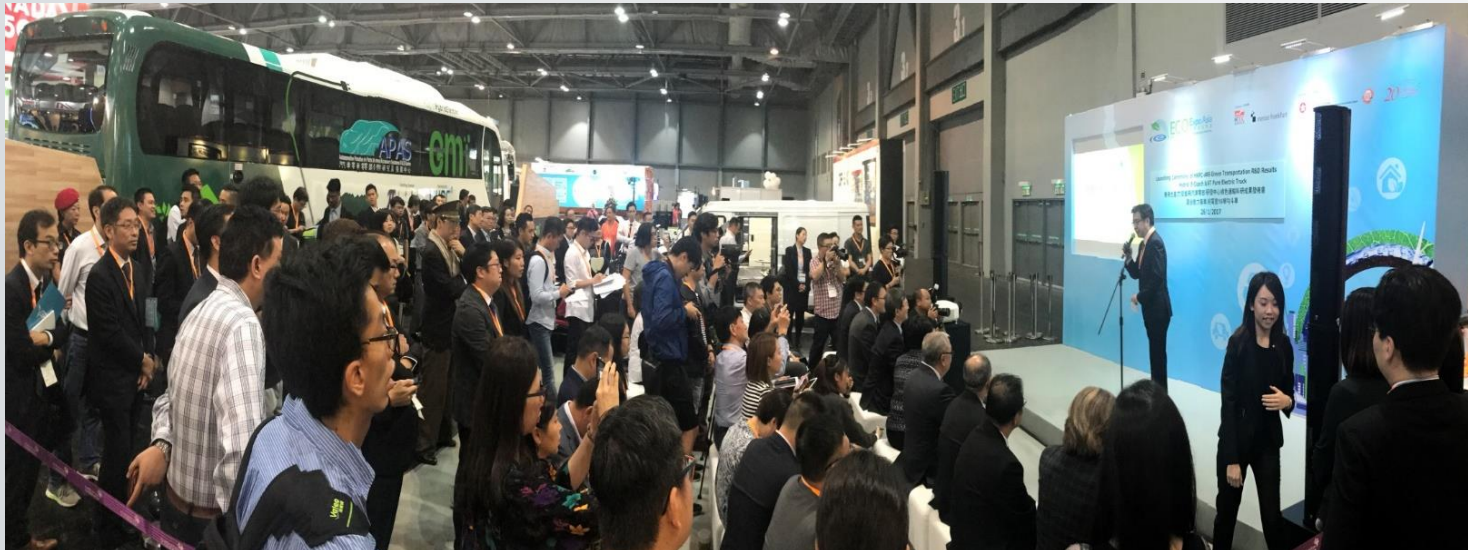
Launching Ceremony  
at Asia World Expo



# The 1st in HK Hybrid e-Coach

**Gm<sup>i</sup>innovations**  
GREEN MOBILITY

**SIEMENS TOSHIBA**



Launching Ceremony  
at Asia World Expo

# Autonomous Electric Tractor

## Parameters

## Specifications

**WEIGHT (kg)**

5000

**MAX LOAD (kg)**

2500

**BATTERY CAPACITY (Ah)/ CHARGING**

550 / 3

**TIME (h)**

**MAX SPEED (km/h)**

22

## SENSORS CONFIGURATION

**2D / 3D Lidar**

2 x 1-Channel / 2 x 16-Channel

**Camera**

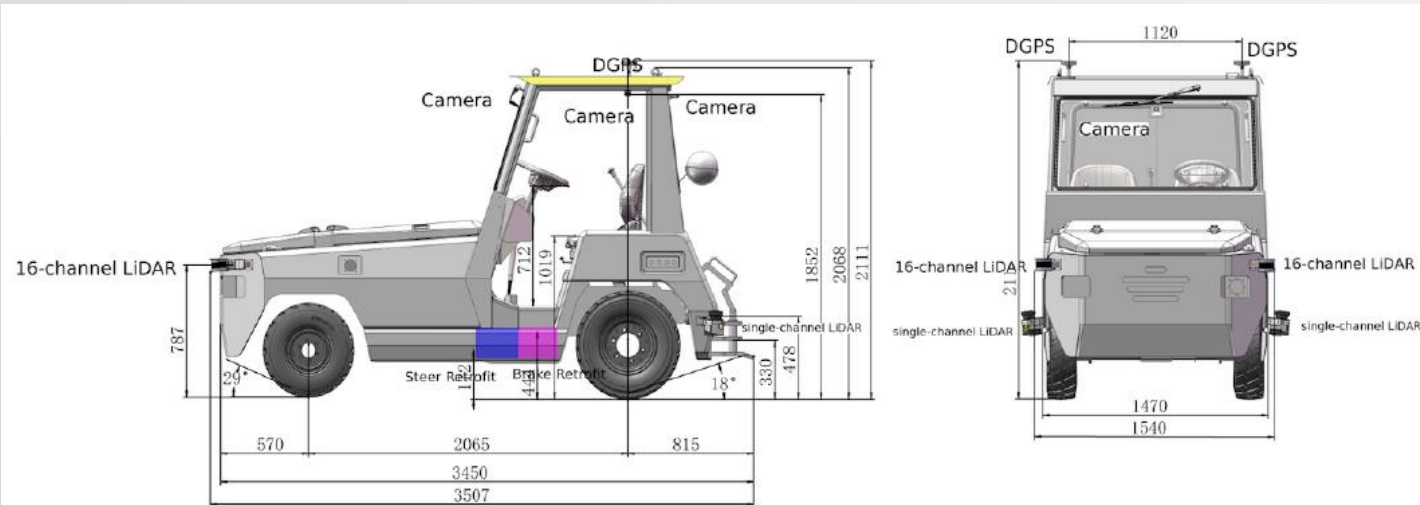
4

**Ultrasonic Radar**

8

**GPS**

1





# Potential Future Applications: *Autonomous E-Bus*



Automotive Parts and Accessory  
Systems (APAS) R&D Centre  
汽車零部件研究及發展中心



中國動力  
China Dynamics



启迪国际  
TUS INTERNATIONAL



清華大學  
Tsinghua University



香港  
國際機場 | HONG KONG  
INTERNATIONAL  
AIRPORT





# Trend: Commercial vehicles electrification





# Fuel Cell Vehicles

## Powertrain & Infrastructure



### 豐田MIRAI——只排水不排廢氣

氫燃料電池車是以氫氣為燃料，氫氣被注入罐中和空氣中的氧氣結合產生化學反應後，在系統內產生電力，驅動馬達讓汽車行駛，此反應排放出純水，沒有廢氣或碳排放，被視為終極環保車。

#### 高壓儲氣罐

以碳纖維製成的儲氣罐有2個，位於後座下方和背面之間

#### MIRAI

馬力：155匹  
扭力：34.2kgm  
最高速度：175km/h  
續航里程：650km  
乘坐人數：4人



馬達  
前方車蓋下是馬達驅動前輪

#### 燃料電池組

使氫與空氣中的氧發生反應來發電的燃料電池組在中央

#### 動力電池

加速時輔助燃料電池之用

#### 輸出電力

停車時可透過端子向外部供電



- \* Fast fueling
- \* Long range distance
- \* Less battery

# Roadmap of Green Transportation – Chargers, Energy Storage

- Completed
- On-going
- Future



50kW



100kW



Pantograph



>??kW  
Higher Power DC Charger

Connected Chargers  
Platform



High Power  
• OCPP?  
• Retired Batteries?

Dynamic Loading  
+  
Retired Batteries



Celling



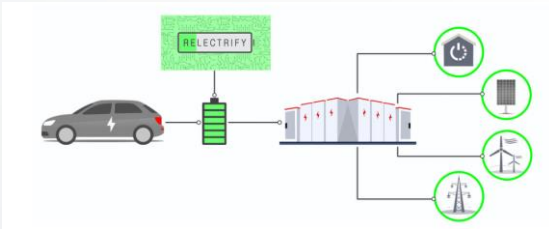
Wireless



Semi-Fast



Mobile Charger

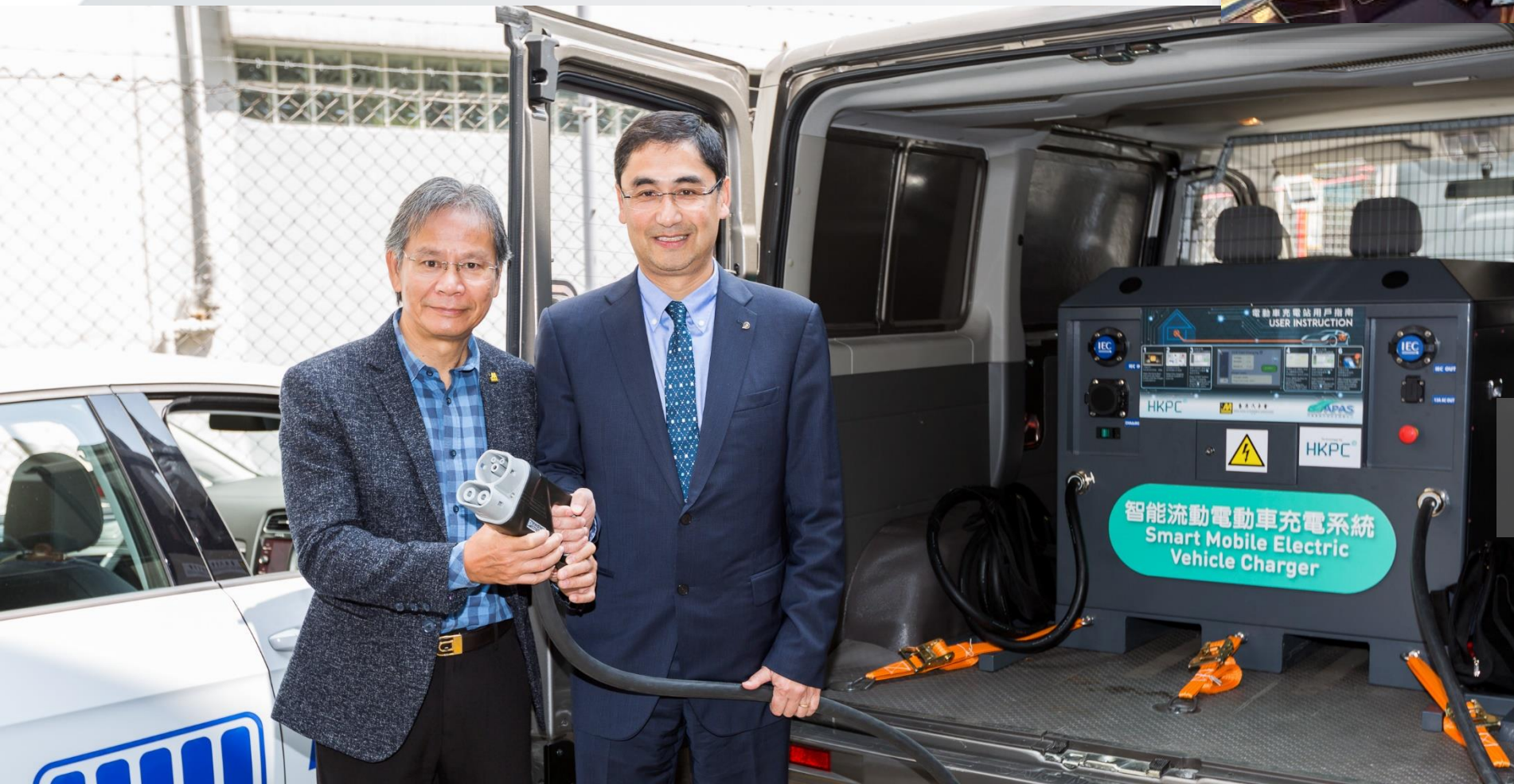




# Geneva Invention Award Mobile Charger



香港汽車會  
HONG KONG AUTOMOBILE ASSOCIATION  
SINCE 1919



Multi-standard  
Mobile EV-Charger



# Hong Kong Awards for Industries Portable Charger Kit

HKEVN



2017  
香港工商業獎  
HONG KONG AWARDS  
FOR INDUSTRIES

設備及機器設計獎  
EQUIPMENT AND MACHINERY  
DESIGN AWARD



- Handheld charger
- Low installation cost  
(1/10 of the traditional charger)



# Serving in many carpark..... 50kW Fast Charger



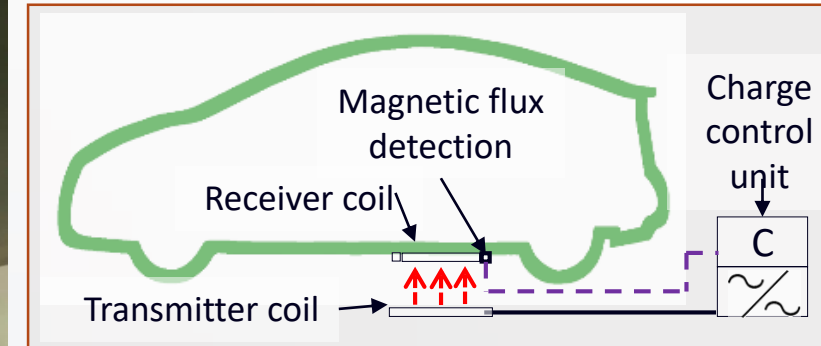
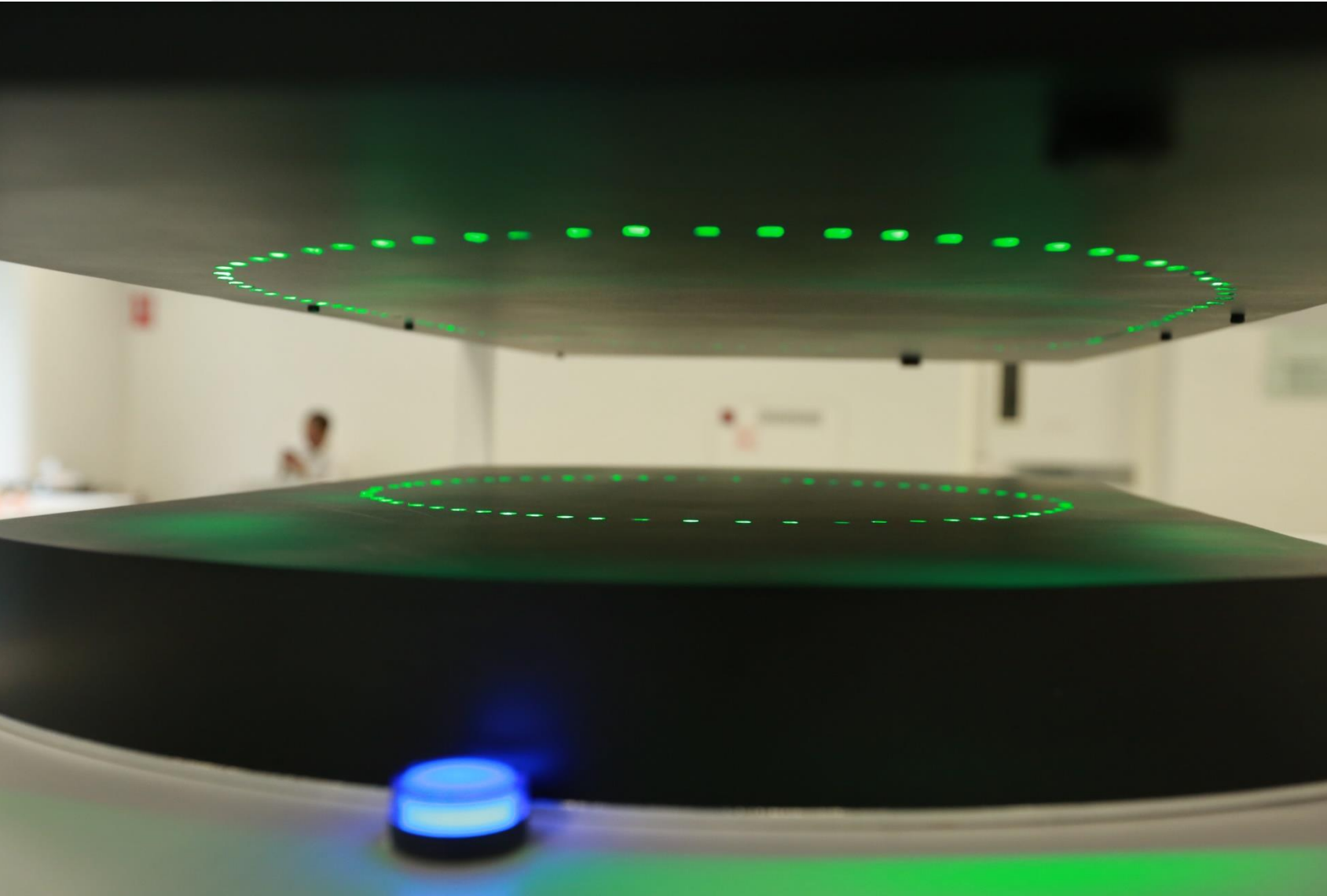
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香港房屋協會



Total charged  
>5200kWh(度電)

>= 2100 times  
travels from  
Kowloon Tong  
to Repulse Bay

# The 1<sup>st</sup> in HK EV Wireless Charger





Facilitates commercial vehicles

# Pantograph High Power Charger

300-600KW  
Flash charging



Opportunity charges for round trips:

Hybrid e-minibus 640V/25Ah	Max 180A charging	4 mins for 7kwh	15km
Hybrid e-coach 650V/80Ah	Max 450A charging	4 mins for 20kwh	25km

# Smart EV Charging Station

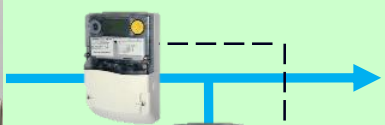
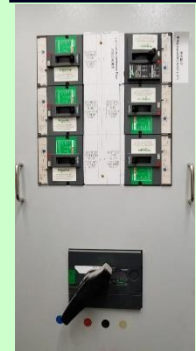
- Real-time status of EV chargers
- Regulate EV charging current based on demand

CLP 中電

HONG KONG  
HOUSING SOCIETY  
香港房屋協會

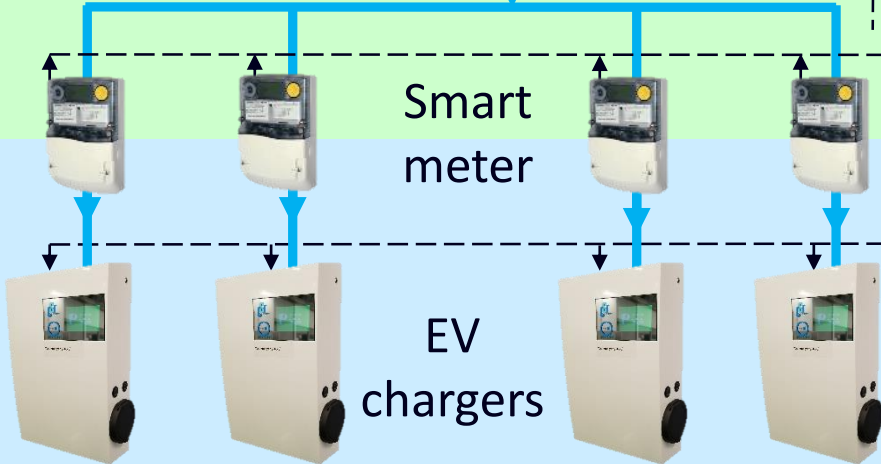
## Electrical Room

Distribution



EV Charging  
Station

Smart  
meter



EV  
chargers

measurements

Server



Load

Internet



Web  
Portal

## Office



Control  
Terminal



Charging Station



這智能充電器首次引入「喜薈」





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