Development of Electric Vehicle Charging Network

(Technical Guidelines On Charging Facilities For Electric Vehicles)

14 September 2018

Environmental Protection Department

Why Electric Vehicles ?

- Electric vehicles (EVs) have no tailpipe emissions
- Replacing conventional vehicles with EVs can improve roadside air quality
- Commercial vehicles account for 95% of emissions from vehicle fleet. Promoting wider use of commercial EVs and use of public transport should take priority.

Promoting EV – the Challenges

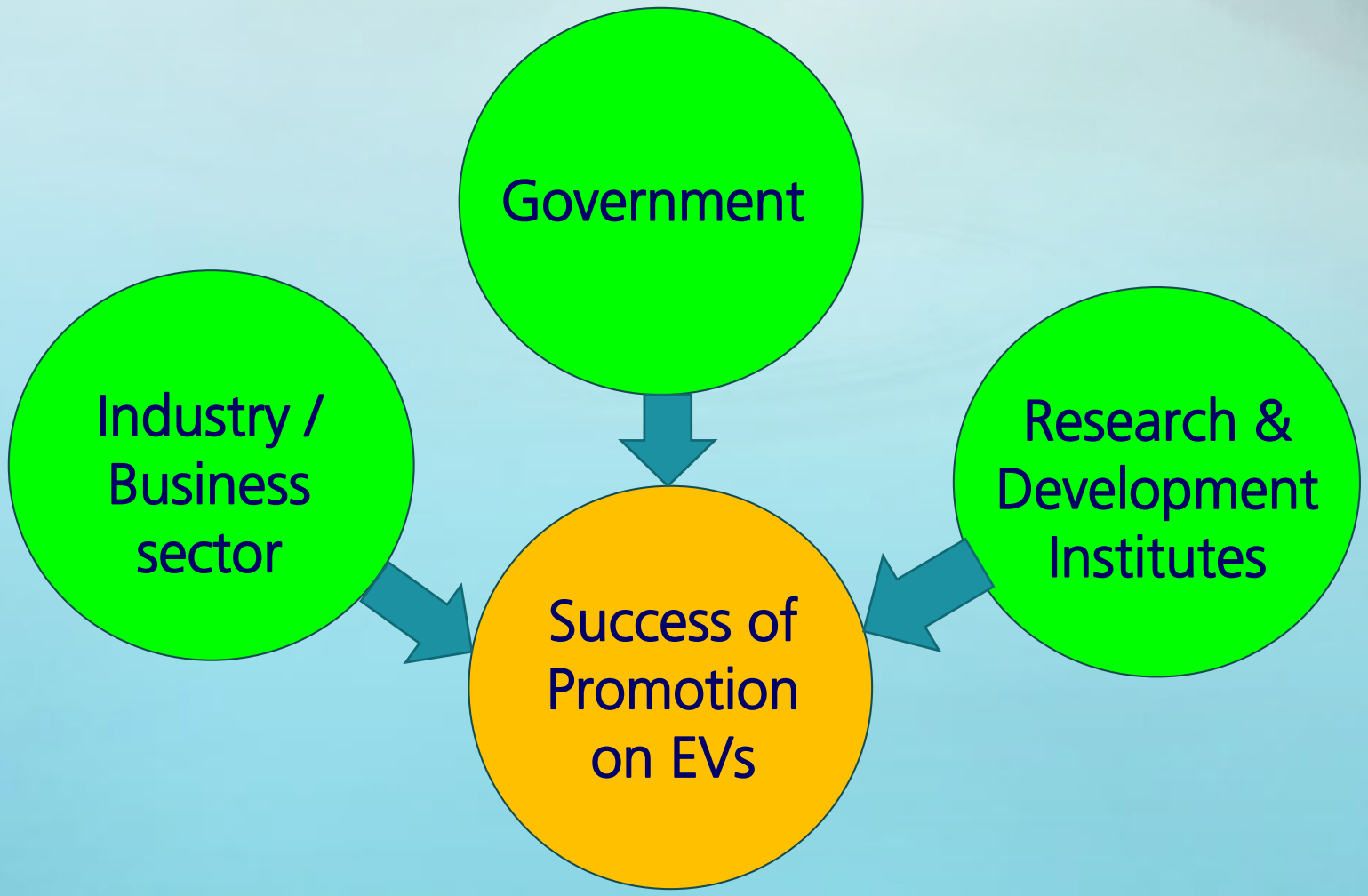
- Problems
  - Cost
  - Service life of battery
  - Charging time
  - Land and space
  - Spare electricity supply

Spare Electricity Supply

- Concern on spare power supply to existing buildings
- The two power companies provide one-stop services for EV chargers
- If additional power supply is required, the two power companies may provide assistance

Solutions

- Key parties should work together



Charging support for EVs

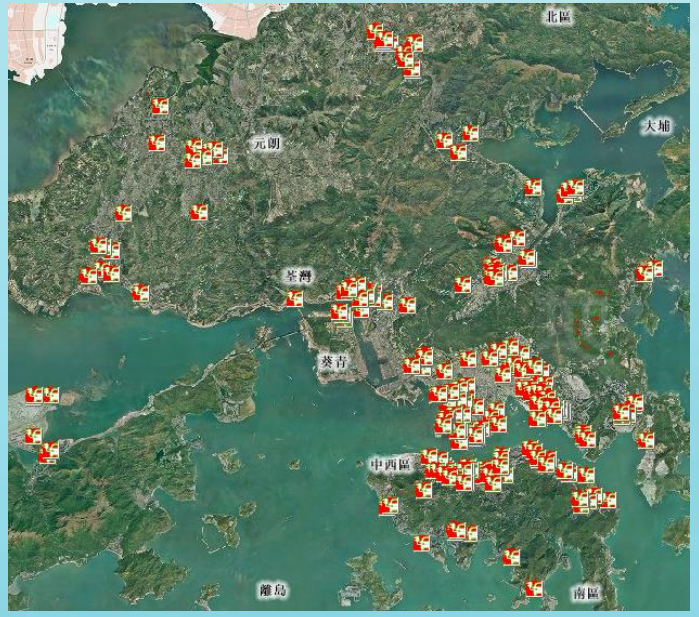
- EVs should preferably be charged at homes or workplaces.

Role of Public Charging Network

- ***Public chargers*** are for ***opportunity charging***, topping up batteries to complete remaining journeys of EVs when necessary.
- ***Medium chargers*** should form backbone of Government public charging network

Charging support for EVs

- As at end June 2018, there are some 1,970 public EV chargers (Government & private ones), including
  - 739 medium chargers
  - 385 quick chargers



Technical Guidelines
On
Charging Facilities For Electric Vehicles

Issued by the Electrical and Mechanical Services Department

Purpose of the Technical Guidelines

- Set out the statutory requirements and general guidelines for installation of charging facilities for EVs in Hong Kong.

Statutory Requirements

- EV charging facilities are fixed electrical installations (FEI) and shall comply with the relevant requirements of the Electricity Ordinance (Cap. 406) and its subsidiary Regulations.
- Design and installation shall be carried out by registered electrical contractors (REC) and registered electrical workers (REW).

International and National Standards

- International Electrotechnical Commission (IEC).
- Society of Automotive Engineers (SAE)
- GuoBiao (GB)
- CHAdeMO (for DC quick charging)

International and National Standards

Standard	
IEC	IEC 61851
SAE	SAE J1772
GB	GB/T 20234
CHAdeMO	CHAdeMO

IEC 61851 - Modes of Charging

- Mode 1

- Mode 2

- Mode 3

- Mode 4

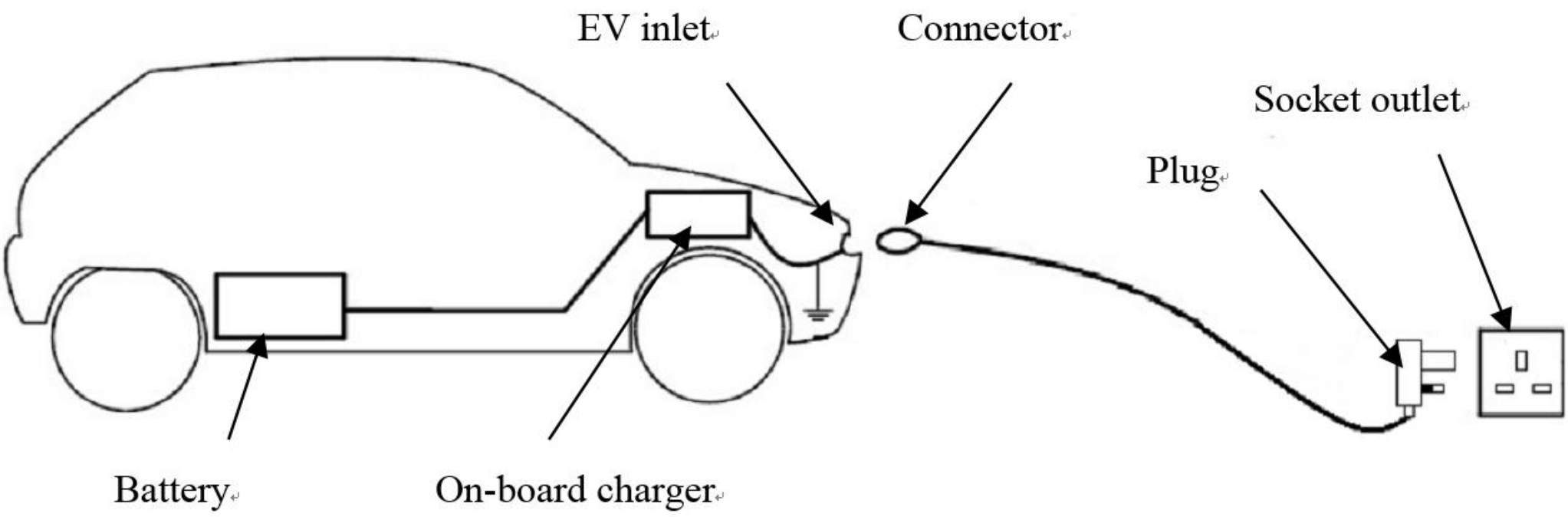
Modes of Charging

Under IEC 61851-1:2010 on Electric Vehicle Conductive Charging System, there are 4 possible modes of EV charging -

- Mode 1 : use of standard socket outlet without communication;
- Mode 2 : use of standard socket outlet with in-cable or in-plug control pilot cable;
- Mode 3 : use of dedicated socket outlet where control pilot cable permanently connected to ac source; &
- Mode 4 : use of off-board charger i.e. DC quick charger.

Mode 1

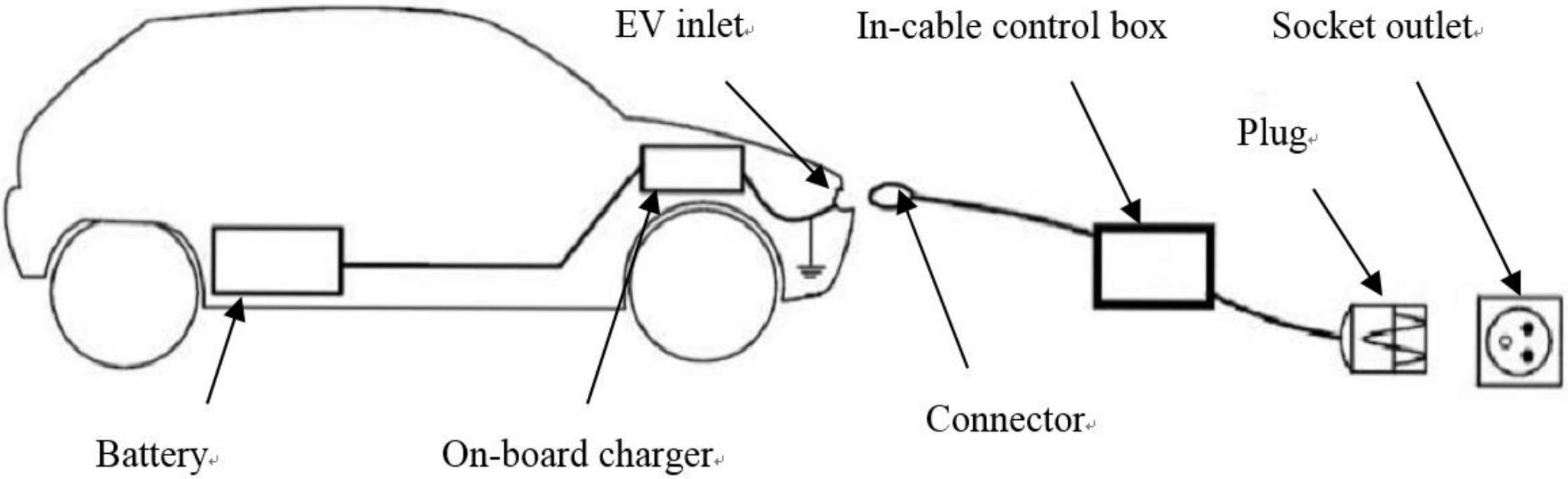
Use of a standard socket outlet without communication and the presence of a residual current device (RCD) is a must on the supply side, rated up to 16A.



Mode 1

Mode 2

Use of a standard socket outlet without communication and the presence of a residual current device (RCD) is a must on the supply side, rated up to 32A.



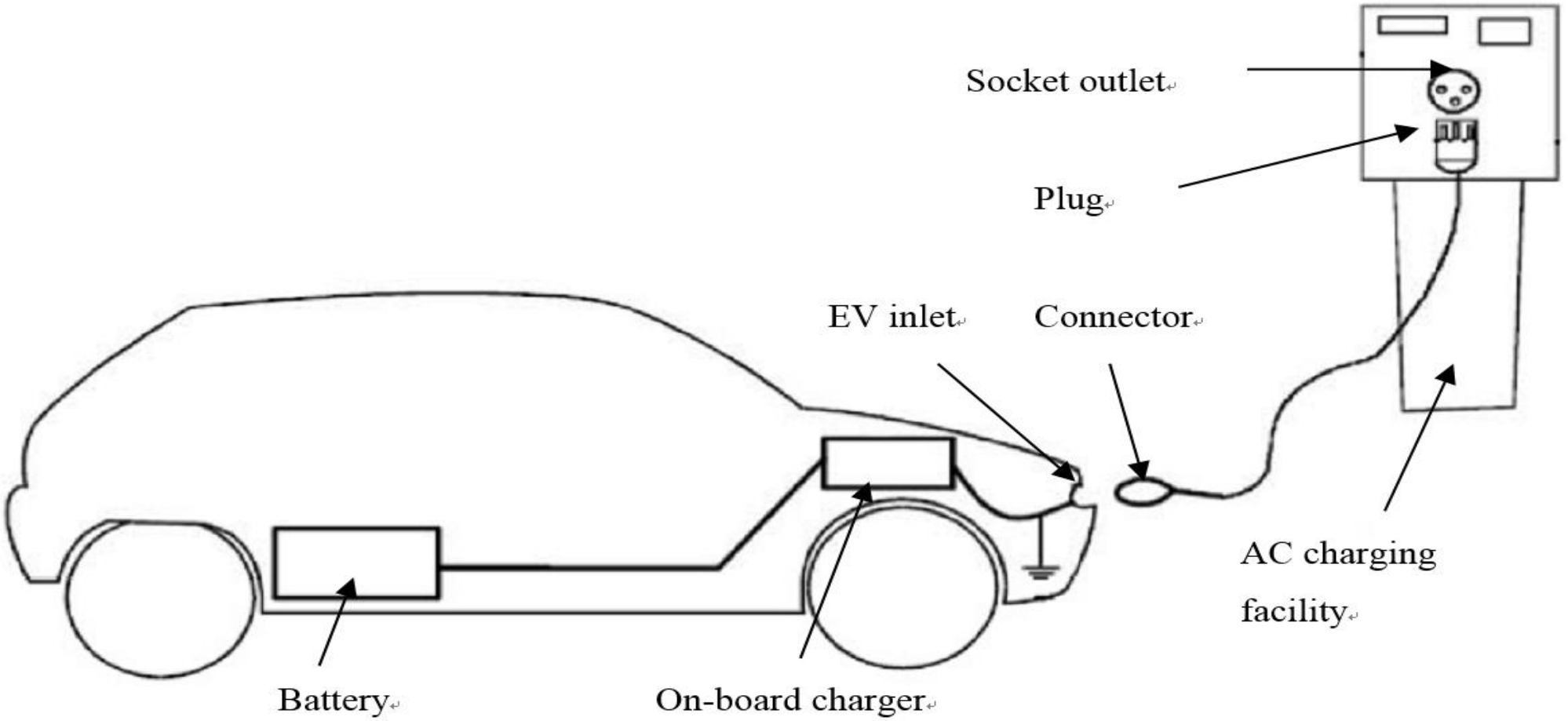
Mode 2


MAXIMUM CURRENT
13 A
READY
CHARGE
FAULT


充電插座
Charging Socket Outlet
CHARGING POINT
電気自動車

Mode 3

Use of a dedicated socket outlet where control pilot cable permanently connected to AC source

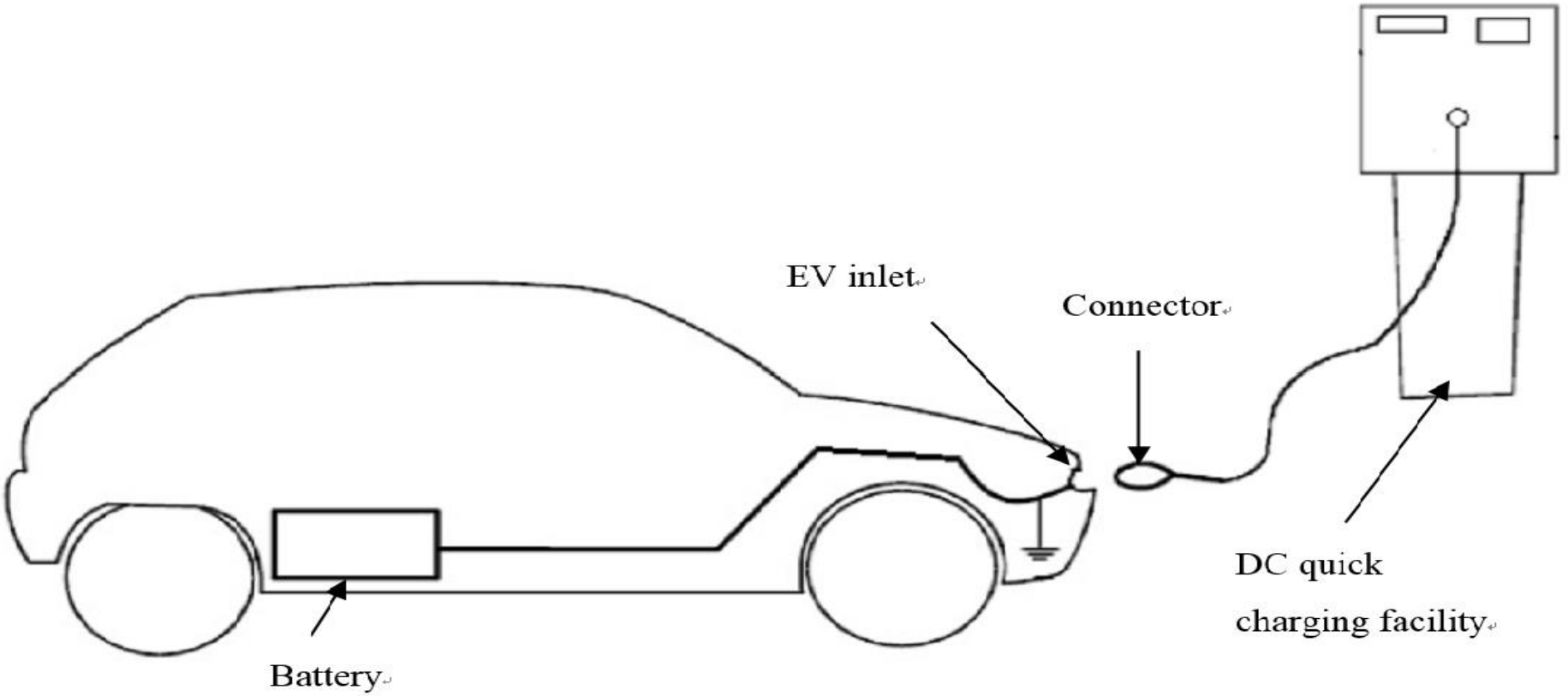


Mode 3

Examples: IEC 61851 Mode 3 Medium Chargers installed at Government Carpark for public use

Mode 4

Use of an off-board charger i.e. DC quick charger



Mode 4

DC quick charger - CHAdeMO

- Input Power : 3 phase, 380V, 100A
- Output Power : 50kW
- 80% charged in 30 min

Mode 4

DC quick charger – Multi-standard System

- CHAdeMO,
  CCS :50kW
- IEC 62196 : 43kW
- 80% charged in 30
  min

Mode 4

DC quick charger
– Multi-standard System

Charging Configurations Adopted by Various Electric Vehicles

Different brands of EVs have different charging modes:

i) IEC Mode 2
ii) IEC Mode 3
iii) DC Combo-2 Interface (80% in 30min)
iv) SAE->IEC Mode 3
v) CHAdeMO

Electric Vehicle Supply Equipment

Electric Vehicle Supply Equipment (EVSE)

- designed and tested to support IEC 61851 Mode 3

IEC type 2 to SAE cable

IEC type 2 to IEC type 2 cable

Electric Vehicle

General Guidelines on EV Charging Facilities

Final Circuit

- A separate radial circuit
- Conductor size of minimum 32A rating

Protective Device

- Each final circuit protected by HBC fuse or MCB of suitable rating
- RCD with type A characteristics and operating current not exceeding 30mA

Socket Outlet and Plug (EV Connectors)

Commonly adopted EV connectors for charging

a) BS 1363

b) IEC 60309

c) SAE J1772

d) IEC 62196

BS 1363

IEC 60309

SAE J1772/ IEC 62196 Type 1

IEC 62196 Type 2

DC-Combo Charging

How the Combined Charging System Responds

AC national standards remain the same.
Two additional Pins allow DC charging in the same vehicle inlet while accepting the legacy AC connector.

General Guidelines on EV Charging Facilities

Type Test Certificate for EVSE

- Compliance with the relevant IEC, SAE, GB or CHAdeMO standard(s)
- IP 54 or above for outdoor EVSE

Technical Support

EPD's dedicated team and EV hotline to provide information and technical support

查詢熱線 Hotline 3757 6222

Copy of the "Technical Guidelines on Charging Facilities for Electric Vehicles" available at -

www.emsd.gov.hk/filemanager/en/content_444/Charging_Facilities_Electric_Vehicles.pdf

Appeal for Support from the Hong Kong Institute of Housing

- EV users need chargers for charging at home and office

  - Support of professional bodies / property management companies / incorporated owners are required

- Your support to facilitate the installation of EV chargers is crucial.

Let’s join hands to improve the environment

Your support could help to develop and enhance the charging network for wider use of EVs in a smart city with better air quality

Thank You