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EV Charging Infrastructure

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ABSTRACT: Electric Vehicle Charging Infrastructure, Is most important element of mobility in market. It represent the functional groups, the most popular is the smart charger and it present lots of benefits in respect to offline one. It depicts various charger power , connector type as per the its application. Different charging modes allows to charge an electric vehicle, where a series of complex conditions are desirable in order to ensure as well as AC and DC charging with high power level. It investigates communication protocols, referring to applicable electric vehicles standards. DC communication method is described and analyzed together with ISO 15118 standard and its structure. In addition it describes OCCP protocol which ensures communication between an operator and the charger.

I. INTRODUCTION

The large portion of world is occupy by the vehicles in the word. Total energy consumption is in the transportation sector, due to which there are high economical and large amount of increasing demand of energy and also causes CO₂ emission on greater amount. To increase energy security, to mitigate the impact of the emissions of greenhouse gases and automotive powertrain electrification in transportation sector could play an important role. In several countries they have announced to stop selling vehicles those fueled by diesel or petrol. Countries like, the United Kingdom set the 2040 as the target year. The European Union (EU) have taken a decisive step forward in implementing the EU's commitments under the Paris Agreement for a binding domestic CO₂ reduction of at least 40% until 2030 . Electric vehicles (EVs), are the main element of clean and green travel mode, which are widely spreading over the all world.

Electric vehicle supply equipment (EVSE) is the basic unit of EV charging infrastructure. The EVSE accesses power from the local electricity supply and utilizes a control system and wired connection to safely charge EVs. An EVSE control system enables various functions such as user authentication, authorization for charging, information recording and exchange for network management, and data privacy and security. It is recommended to use EVSEs with at least basic control and management functions, for all charging purposes

Conductive charging, or plug-in (wired) charging, is the mainstream charging technology in use. Requirements of EVSE for conductive charging depend on factors such as vehicle type, battery capacity, charging methods, and power ratings




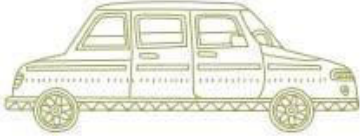
The governance of EV charging infrastructure depends on its ownership and use. Broadly, EV charging infrastructure can be classified as public, semi-public and private. These are not fixed categories and some charging facilities may demonstrate hybrid characteristics. For instance, charging infrastructure owned by EV fleet owners/operators for captive use is considered private, but it can be opened to the public as a paid charging service when fleets are in circulation. EV charging infrastructure at bus depots or metro station parking may be semi-public or public, depending on whether they are open only for transit users or for all EV users.

II. FIGURES AND GRAPHS

Typical battery specification for different EV segments

E-2Ws and e-3Ws are powered by low-voltage batteries. The first generation of e-cars is also powered by low voltage batteries. However, these are likely to be phased out in the future, even if they continue in specific use cases

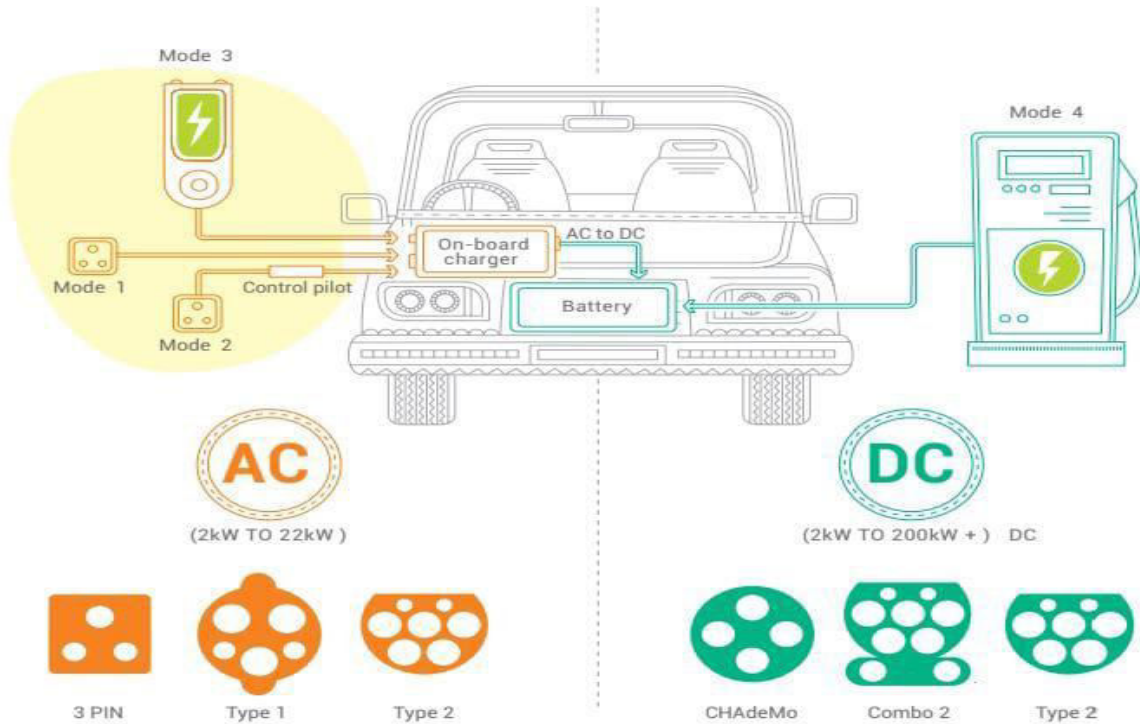
such as taxis. The second generation of e-cars, as seen in the upcoming e-car models, is powered by high-voltage batteries. Electric LCVs will comprise of both low-voltage and high-voltage vehicles, depending on their load-carrying capacity.

VEHICLE SEGMENT	BATTERY CAPACITY	BATTERY VOLTAGE
 E-2W	1.2-3.3 kWh	48-72V
 E-3W (passenger/ goods)	3.6-8 kWh	48-60V
 E-cars (1st generation)	21 kWh	72V
 E-cars (2nd generation)	30-80 kWh	350-500V

Power ratings and method of charging

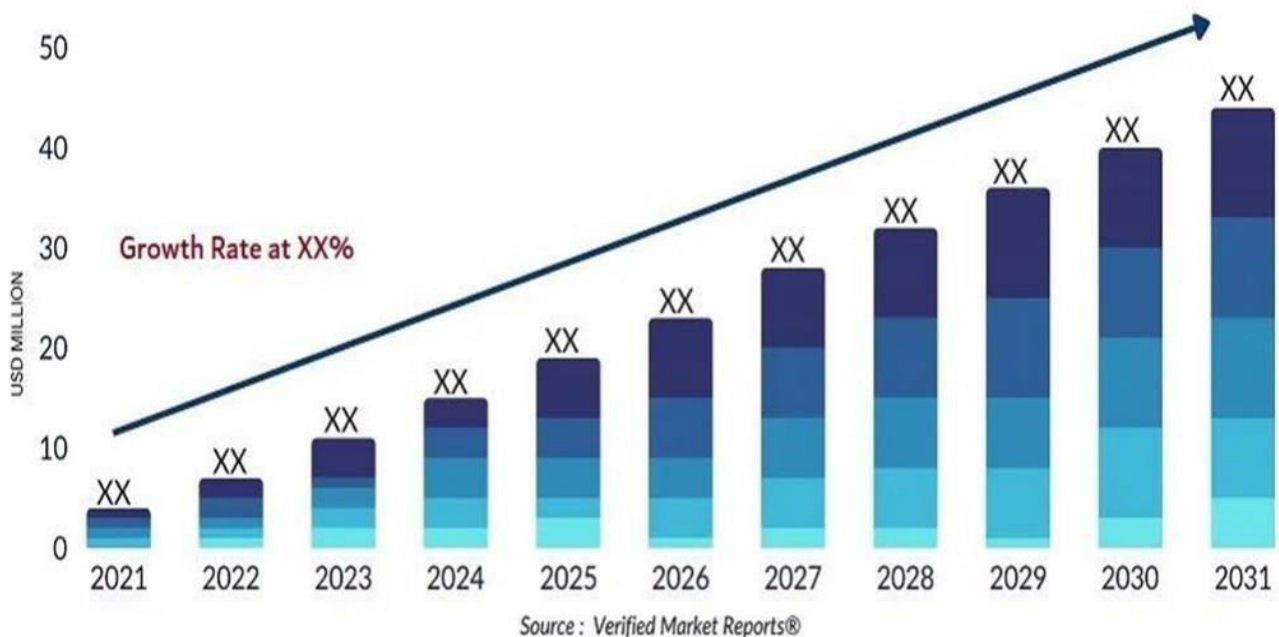
Modes 1 and 2 are applicable for connecting an EV to a standard socket outlet, utilizing a cable and plug. Mode 1, also known as dumb charging, permits no communication between the EV and EVSE and its use is not recommended. The portable cable used in Mode 2 has an inbuilt protection and control capability and is typically used for home charging. Modes 3 and 4, which provide a separate charger device to supply power to the EV, have improved control systems and are used for commercial or public charging.

Conductive charging can be AC or DC. In the case of an AC EVSE, the AC power is delivered to the onboard charger of the EV, which converts it to DC. A DC EVSE converts the power externally and supplies DC power directly to the battery, bypassing the onboard charger. AC and DC charging are further classified into four charging modes, with Modes 1-3 pertaining to AC charging and Mode 4 pertaining to DC charging.



FUTURE SCOPE

Global Electric Vehicles Charging Stations Market Size and Scope



III. ADVANTAGES

EV recharging is completed in minutes.

Batteries can be charged away from swapping point, allowing more freedom in setting up swap facilities.

Reduction in upfront cost of EV, as battery ownership is replaced by battery leasing.

Increased predictability of battery life due to controlled charging conditions.

IV. CONCLUSION

Electric Vehicle (EV) charging infrastructure is essential for realizing the full potential of electric vehicles. A well-developed and accessible charging network addresses range anxiety, promotes EV adoption, and reduces carbon emissions.

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