ELECTRIC VEHICLE CHARGING STORAGE INFRASTRUCTURE

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ABSTRACT:

This paper describes electric vehicle charging infrastructure, which is an important element of the mobility market. It presents electric vehicle functional groups, where smart chargers are the most popular and provide lots of benefits in respect to offline ones. It also depicts chargers types according to a connector type, charger power and its application. It investigates communication protocols, referring to applicable electric vehicles standards. 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 describes OCCP protocol which ensures communication between an operator and the charger.

INTRODUCTION:

An electric vehicle (EV) is a vehicle that uses one or more electric motors or traction motors for propulsion. An electric vehicle may be powered through a collector system by electricity from off-vehicle sources, or may be self-contained with a battery, solar panels, fuel cells or an electric generator to convert fuel to electricity.

The running cost of an electric vehicle is much lower than an equivalent petrol or diesel vehicle. Electric vehicles use electricity to charge their batteries instead of using fossil fuels like petrol or diesel. Electric vehicles are more efficient, and that combined with the electricity cost means that charging an electric vehicle is cheaper than filling petrol or diesel for your travel requirements. Using renewable energy sources can make the use of electric vehicles more eco-friendly. The electricity cost can be reduced further if charging is done with the help of renewable energy sources installed at home, such as solar panels.

The increasing pressure to reduce emissions currently has the greatest impact on the mobility market. According to the decision of the European Commission, the sale of cars with zero emission and hybrid one with low emissions (less than 50 g CO_2 / 100 km) should constitute 20 % sales by 2025 and 35 % until 2035. A similar trend can be observed also in relation to public transport. These changes force the introduction of innovative solutions not only by the manufacturers of electric vehicles, but also in the infrastructure ensuring charging of vehicles [1]. The development of power networks is necessary. In places with an increased demand for charging services, it may be necessary to store energy to reduce the load on the grid during rush hours. The development of fast and ultra-fast chargers infrastructure is indispensable, especially for public transport, but also for smaller vehicles.

PROBLEM STATEMENT:

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Electric vehicles can reduce fuel costs dramatically because of the high efficiency of electric-drive components. Because all-electric vehicles and PHEVs rely in whole or part on electric power, their fuel economy is measured differently than that of conventional vehicles. Miles per gallon of gasoline equivalent and kilowatt-hours (kWh) per 100 miles are common metrics. Depending on how they are driven, today's light-duty all-electric vehicles (or PHEVs in electric mode) can exceed 130 MPGe and can drive 100 miles consuming only 25–40 kWh.

All-electric vehicles and PHEVs have the benefit of flexible charging because the electric grid is near most locations where people park. To safely deliver energy from the electric grid to a vehicle's battery, a charging station, sometimes referred to as electric vehicle supply equipment (EVSE), is needed. Drivers can charge overnight at a residence, as well as at multi-family housing, the workplace, or a public charging station when available. PHEVs have added flexibility because they can also refuel with gasoline or diesel (or possibly other fuels in the future) when necessary.

CHARGING CONNECTORS:

As there are different chargers for different smartphones so similarly there are different charging cables and plug types for different electric vehicles. There are specific factors that matter when picking the right EV charging cable such as power and amps. The amperage rating is crucial for determining the charging time of the EV; the higher the Amps, the shorter will be the charging time.

First, when charging, observe frequent charging and shallow discharge.
In terms of charging frequency, keep the battery fully charged. Don't charge the battery when the power of the battery is less than 15% to 20%. Excessive discharge will cause the positive active material and negative active material in the battery to gradually convert into resistance, so as to reduce the service life of the battery
The difference between DC and AC charging modes.
DC and AC charging modes are also called fast charging and slow charging because of different charging time.

The fast charging method is “simple and rough”: direct current is directly stored in the power battery; The slow charge needs to be converted into DC through the on-board charger, and then charged into the power battery.

Fast charge or slow charge?

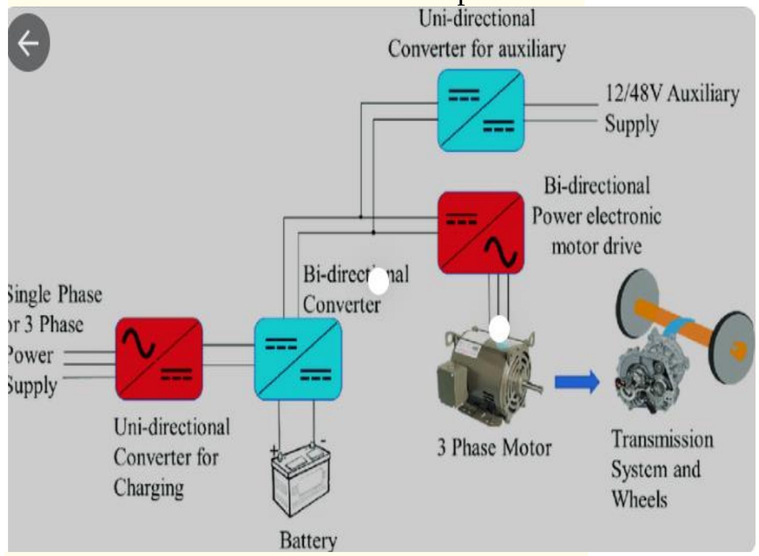
From the perspective of charging mode, whether fast charging or slow charging, the principle of charging is the process of transferring lithium ions from the positive electrode of the cell to the negative electrode of the cell under the action of external electric energy, and the difference between fast charging and slow charging lies in the speed of lithium ion migration from the positive electrode of the cell during charging.

When using the car at ordinary times, the battery can be polarized at a normal speed by alternating slow charge and fast charge, so as to prolong the service life of the battery.

Always charge with the vehicle off.

CONVERTERS USED IN EV:

The large number of automobiles in use around the world has caused and continues to cause serious problems of environment and human life. Air pollution, global warming, and the rapid depletion of the earth’s petroleum resources are now serious problems.



The considered losses in a power converter are the losses produced by the semiconductors switches (IGBTs and DIODES) and the passive components (capacitors and inductors). The aim of this explanation is only to give an idea about the losses estimation. This estimation is used in this study to calculate the efficiency. The efficiency of a power converter is given by:

CONCLUSION:

Automatisation may enable drastically changed behavior as well as “servicification” will. Electrification may give the user the experience of 100% sustainability but in total the changes may lead to unwanted or wanted consequences depending on the sum of individual behaviors. This must be considered when planning for increased e-mobility.