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EV Charging System: An Overview

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***Abstract*— Electric vehicles is a new technology has emerging in transportation sector to counter the drawbacks of conventional vehicle in terms of economic and environmental. Now a days, battery is the single source of energy, which plays the vital role in the transportation sector. The battery gets charged from an external source, like grid, solar etc. Mainly, the nature of source is an alternating current (AC), which needs to convert to DC with the help of rectifier and feed to DC-DC converter for fast charging. There are two types of charger provided by the manufacturer, i.e., On-board and Off-board charger. This paper presents the various charging infrastructure including battery charger, charging station and it focused on the technology behind the DC fast charging. A comparative study has been given based on electric range, charger power and charging time.**

Keywords—Electric vehicle; PHEV; EVSE; CHAdeMO; Fast Charging; SAE Combo

VIII. INTRODUCTION

In late many years, oil utilization in the vehicle area has expanded at a higher rate than n some other areas. As per a factual examination, worldwide oil stores will run out by 2049, with the current rate at which new oil saves are found and the current utilization rate. The expansion in oil utilization was mostly because of new requests for vehicles controlled by regular inner burning motors. The boundless utilization of inside ignition motor (ICE) vehicles has drastically added to contamination in medium and enormous urban communities. Since the ecological issues of the nursery impact and an Earth-wide temperature boost are straightforwardly identified with vehicle outflows, government organizations and offices have created stricter norms for fuel utilization and emanations [1], [2].

In this situation, battery-fueled electric vehicles (EVs) seem, by all accounts, to be the ideal answer for settle the energy emergency and a worldwide temperature alteration since they have zero oil utilization and zero outflows out and about. Zero neighborhood discharges and calm driving of electric vehicles are a portion of the highlights that will help reestablish expectations for everyday comforts in urban areas. Contingent upon the brief distance and continuous unpredictable driving qualities of city driving, electric vehicles can give execution like that of the ICE vehicle at a lower cost than conventional fuel motor vehicles under city driving.

The research and Development (R&D) community is concerned that the use of fossil fuels has been on the rise since the later 1900s. Fossil fuel consumption is rising, posing environmental risks such as GHG emissions and energy independence. It has spurred governments all around the world to devise methods to deal with these problems. CO2 emissions from the transportation industry are considerable. Electrification of the transportation industry has recently gotten a lot of attention as a possible and good answer to the challenges mentioned above. In the near future, several European nations have started to establish and implement surface transportation electrification systems. Despite its tiny population, Norway is one of the world's top buyers of electric vehicles.

IX. TYPES OF EV CHARGING

Generally, there are three levels of charging devices are used for the charging of EVs, which are Level 1, Level 2 and DC Fast Charging.

A. Level 1, 120 Volt Charging:

Level 1 requires 120 volt for charging a EVs. So, for Level 1 charger, during charging, a home or business outlet may deliver 15-20 amps of current, resulting in a power demand of about 1.4 kW. The manufacturers are providing the Level 1 EVSE with EVs as shown in Figure 1. In general, Level 1 EVSE will take 10-14 hours to fully charge an EV with a range of 90-120 kilometers.

Advantages

- Installation cost is low.

Disadvantages

- Slow charging, i.e. EVs will get around 5 or 8 km of range added per hour of charging

B. Level 2, 208/240 Volt Charging

Level 2 requires 208/240V volt AC power for charging a EVs and also it reduces the charging time as shown in Figure 1 and a J1772 connector. Domestics users commonly use 240 V supply for home appliances for day-to-day affairs. Although most EVs utilize up to 30 amps for 3.3 to 6.6 kW charging, the J1772