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Indian 2020 Public EV Charging Station

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Abstract: Over the years, there has been a tremendous increase in road transportation and vehicular traffic due to an exponential growth in economic development and consumption habits throughout the world. The effect of vehicular pollutant emissions is significantly more pronounced in an urban scenario, as compared to regional or global scale. As a world is progressing at a rapid terms of technologies, by utilizing fossil fuels we are moving away from greener earth. There is a need in finding alternative source of energy which can sustain geological balance of our earth and compensate for the depleting fossil fuels. To overcome this crisis, electric vehicles are introduced. At present days, India is the largest market for automobiles with electric vehicle constituting less than 1% of total automobiles on road. There is just production of vehicles but there is no proper charging infrastructure. To overcome this public charging infrastructure is introduced. One of the key problems is public charging infrastructure.

Keywords: Charging station, Indian economy

I.INTRODUCTION

BACKGROUND OF PROGRAM:

In India, marketing of automobiles supported by approximately 45000 petrol/diesel refuelling stations. In comparison there are only 224 charging stations of Mahindra Reva e20 Car across approximately 17 cities of India. Also the public charging stations tend to be concentrated to particular areas of those cities. These charging stations include both paid and free stations. The major challenge faces by the OEMS is the installation of charging infrastructure to support their EV customer base and distribution. Many countries have already developed a systematic charging infrastructure to boost the market acceptance of Electric Vehicles (EV).

RELEVANCE AND APPLICATION TO FIELD.

Greenhouse effect: Electric vehicle produces no harmful emissions while driving.

Efficiency: Electric drive motors have high degree of efficiency up to 95% compared to IC Engines that have an efficiency of 35 – 40%.

The electric drive motor is highly efficient particularly in lines and bumper – to – bumper traffic.

Maintenance: Electric drive motor is very robust and requires little maintenance. It is only subject to minor mechanical wear and EV does not require any lubricant oil.

Noise pollution: Electric drive motors run quieter than IC Engines. The noise emissions from electric vehicles are very low.

Energy saving: Electric vehicles require energy only when the user needs it when compared with conventional vehicles.

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Easy Charging to electric vehicle: The high voltage battery can be charged at home, in a car parking and by using any accessible socket the charging connector on the vehicles and on public charging stations has been standardized and use by all manufacturers.

METHODOLOGY OFIMPLEMENTATION

Methods to implement the Public charging stations follow:

- Recharging stations
- Battery swapping stations
- Extended range stations

1). Recharging station: It is an element in an infrastructure that supplies electric energy for the recharging of electric vehicles, such as plug in vehicles.

There are three types of recharging:

- Normal AC Charging Stations
- Fast AC Charging station
- DC fast charging station

Type	Current Specifications	Charging Rate	Time For Full Battery Charging
AC level 1	120V AC	3.2Km to 8Km/ hour of charging	6-8 hrs
AC level 2	240V or 208V AC	16Km to 32 Km/ hour of charging	3-4 hrs
DC fast	240V DC Or maximum 600V DC	80Km to 113 Km/ 20 min of charging	10-20 min

2). Battery Swapping Stations: A battery swapping station is a place at which a vehicle's discharged battery or battery pack can be immediately swapped for a fully charged one, eliminating the delay involved in waiting for vehicle's battery to charge.

3). Extended charging station:

Different types of technologies of charging stations are:

- Smart grid communication
- Renewable electricity and RE charging Stations
- SPARC Stations
- E-Move Charging Stations
- Wind powered charging station

Smart grid communications: Recharging a large battery pack presents a high load on the electrical grid, but this can be scheduled for periods of reduced load or reduced electricity cost. In order to schedule the recharging, either the charging station or the vehicle can communicate with the smart grid. Some plug in vehicles allows the vehicle operator to control recharging through a web interface or smartphone app. Furthermore, in a vehicle to grid scenario the vehicle battery can supply energy to the grid at periods of peak demand. This requires additional communication between grid, charging station, and vehicle electronics.

Renewable electricity and RE charging Stations: Charging stations are usually connected to the electrical grid, which often means that their

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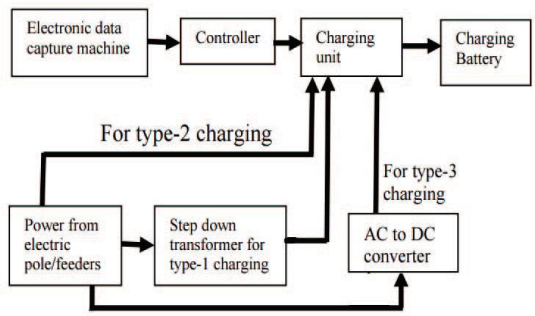
electricity originates from fossil – fuel power stations or nuclear power plants. Solar power is also suitable doe electric vehicles. Solar city is marketing its solar energy system along with electric car charging installations.

SPARC Stations: The SPARC (Solar powered automotive Recharging Station) uses a single custom fabricated monocrystalline solar panel capable without drawing electricity from the local grids. Plans for the SPARC include a non – grid tied system as well as redundancy for tying to the grid through a renewable power plan. This supports their claim for net-zero driving of electric vehicle.

E-Move Charging Stations: The E move charging station is equipped with eighth monocrystalline solar panels, which can supply kWp of solar power. With further refinements, the designers are hoping to generate about 2000 kWh of electricity from the panels over the year.

Wind powered charging station: in 2012, urban green energy introduced the world's first wind powered electric vehicle charging station, the sanya sky pump. The design features a 4kW vertical – axis wind turbine paired with a GE watt station.



REQUIREMENT TO FULLFILL OBJECTIVES:

Type	Connectors/ Plugs Used
AC level 1	NEMA 5-15 connector
AC level 2	NEMA 5-15 connector
DC fast	CHAdeMO SAE J1772

RESULTS

Using the existing electric network is the key to faster adoption of Electric Vehicles and also an opportunity for the distribution companies to contribute towards lowering emissions and increasing their sphere of work. Increasing number of charging stations in India will encourage Electric Vehicle ownership. This in turn will boost the OEM's to release their products in India and foster the growth of Electric Vehicles.

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