International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 06 | June - 2022 Impact Factor: 7.185 ISSN: 2582-3930

MODERN DEVELOPING TRENDS ON BATTERY CHARGING TECHNOLOGY INELECTRIC VEHICLE: A REVIEW

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Abstract- If we go through charging technologies of Electric vehicles there are different types defined in the publication, and also a gear in practical applications. The constant dropping of oil resources and the uprising tail of gaseous pollution, Due to which there are many countries started realizing the importance and moving towards the new energy source vehicles. Among the pitch technologies of electric vehicle (EVs) development is one battery technology. Right now, we are aware with the ongoing circumstances of petroleum product availability. Come across as seems through future reference assemble inconvenience to our present fast-growing lifestyle. Consequently, vehicle manufacturers have grown their production and research of Electric vehicles. Battery charging technologies displayed the enormous market opportunities not even in India also around the globe. Currently, society seems to various adoptions of battery charging technology. The major key aspect of this paper is to exhibit a publication review on the present going on and advance EV charging battery technology. In a quarter of power levels, power flow directions, converters, and control strategies of charging. A review of different charging procedures is introduced as well, specifically; the aim is to set out an efficient method of fast charging techniques with feasible cell cycle entity. Currently, the government of India implies different Tax Benefits for V2H, subvention for PHEVs, charging stations becomes immense, and GHG emission law more extreme. The GST rate of EV is bring down to 12%.The state government sanction SGST. The road tax in EV is completely exempt in first few years; this amendment in Motor Vehicle Act and battery charging technology can act as an enabler.

Keywords: Electric vehicles, Battery charging technology, Battery pack, Rechargeable battery, Li-ion battery.

I. INTRODUCTION

Vehicles are classified into mainly three categories that are: Internal combustion engine vehicles (ICEVs), hybrid electric vehicles (HEVs)-it includes plug-in hybrid vehicle, full hybrid vehicle, series-parallel hybrid vehicle etc and the third type is All-electric vehicles (AEVs) or electric vehicles (EVs) includes fuel cell electric vehicle, Battery electric vehicle etc. From just a while ago around the globe as a adaptable solution to minimize the gaseous emissions and to developed a healthy and clean environment reducing the contrary effect fabricated by utilizing Internal combustion engines (ICEs) in the energy production and as well transportation sectors is only stopped by Electric vehicles (EVs) powered either by the battery, fuel cell or full cell hybrid (FCEV) have attracted great attention to operate more efficiently in contrast to internal combustion engine vehicles (ICEVs), EVs command an efficient energy behind and as well with inconsistent new items. Which simple means and involves add up maintenance and manufacture costs. So, the pointed dare in EV-industry is to evolve and found more modern battery systems. All electrical vehicles have an electric motor alternate of an internal combustion engine. The vehicle uses a large traction battery pack to power the electric motor and must be plugged into a outlet charging or charging station because to run on electricity. Whereas if we seem other components required for energy infrastructure can be required Ultra-capacitors, hydrogen storage systems, hydrogen fuel cells, charging technology for energy

storages, photovoltaic or solar cells, automatic thermoelectric generators, regenerative braking systems, Ultra-Flywheels, and-so-on But the truth never declines for such technology the tariff of an EV comparison to being overpriced than ICEVs. Although battery charging technology represents a renewable higher efficiency in terms of energy utilization, there is a challenge to enlarge it even more.

II. PREVIOUS RESEARCH ON CHARGING TECHNOLOGY OF EVs

From last few years there has been a exponential increase to electric-based vehicles in every sections, including ships, locomotives, aircrafts etc. This transition is anticipated to swiftly advanced, especially with EVs, as the benefits, dropping prices and governmental stimulus, counting due to huge-scale production. The U.S. Energy Information administration framed that the society has an abundant crude oil supply until about 2050. So, that a clear substitute to developed the need of electricity generation for transportation. EVs have been required acknowledged emulsion and carry on with broadly taken step in developing technology i.e., economically attainable which becomes a reality. As we all known EVs offer energy savings through finer fuel economy which brings down emissions produced from renewable sources. Primarily, charging of EVs has been classified by the U.S. Department of the Energy in three different levels as follows: Level 1 is standard charging having power less than 5kW, Level 2 is stands for fast-charging which occurs between 5kW and 50 kW. And Level 3 is for super-fast charging i.e., larger than 50kW. Level 3 charging contains off-board charger, which refers the charger is superficial to the vehicle. Recently, the china Electricity council is trying of manufacturing a powerful push towards a world EV charging standards, i.e., only feasible from all over the globe to engage in the proposal by petition auto manufactures. Tesla's latest ultra fast "Superchargers V3" can have a power output up to 250kW and its decision of investing in future researches opens up doors for manufactures in India.

III. WORKING AND DIFFERENT TYPES OF CHARGING MODES

There are different types of battery specifications for various types of electric vehicles. For example: for cares, we use to prefer lithium-ion batteries with mainly 370V as on nominal DC voltage. Their capacity range of batteries is from 20kwh to 100khw. The simple formula is the greater is the Battery capacity longer is the driving range anxietyof the vehicle it seems that LiFePO4 type is preferable because of its chemically stable and inherently safe. A Rechargeable battery refers simply powers the controller. The below table refers to a favored type of battery in EVs.

Basically, the charging mode reports the safety communication protocol between charging station and EVs. There is a one way for EV charging is to connect the AC supply mains to an on-board charger. Another method for charging an EV is to use an off-board charger for conveying direct current.

Mode 1 charging (Extension cable and domestic socket):

Household charging from a power outlet with a extension cable. There are several countries outlawed. Mode1". The link of the EV to the AC supply mains deploying standardized socket-outlets not more than 16A and 250V AC single-phase or 480V AC three-phase, protective earth conductors and utilizing the power at the supply side.

Mode 2 charging (Cord with a protective device):

The vehicle is linked to the household socket-outlets via the main power grid. Inside the cable a protection device is also step up. The minimum standard of charging a electric vehicle and mode 2 charging cables provide a moderate level of safety.

Mode 3 charging (fast by DC link):

In this case, we use external charger where electric vehicle is connected to the main power. Fast charging system huge power from the gridand due to this cause they are generally connected to the MVnetwork.

Table 1 Popular types of battery in EVs

Battery type	Service life /cycle	Nominal voltage/V	Energy density /(W$h$kg–1)	Power density /(W$kg–1)	Charging efficiency/%	Self-discharge rate /(%$month–1)	Charging temperature/°C	Discharging temperature/°C
Li-ion Battery	600–3000	3.2–3.7	100–270	250–680	80–90	3–10	0 to 45	-20 to 60
Lead acid Battery	200-300	2.0	30-50	180	50-95	5	-20 to 50	-20 to 50
NiCd Battery	1000	1.2	50-80	150	70-90	20	0 to 45	-20 to 65
NiMH battery	300-600	1.2	60-120	250-1000	65	30	0 to 45	-20 to 65

IV. PRESENT ONGOING CHARGING NETWORK

In India, many of the electric vehicles are having an on-Board Battery-charging system. We connect a charging point from the power cable to vehicle at charging station; there are one or more charging points for charging purposes. Usually for self-owned cars a worth charging power is less than 2.5kw. Here, single phase power line is used. As we contrast with other types of batteries, the LI-ion has sufficiently secure conduction but lower life cycle at higher temperature condition. These modern approaches of charging can also helps in protecting batteries prolonged, overheating the system life and as well improve the functional utilization.

Traditional battery charging approach

There are a bit well liked charging methods to decode the battery charging problem i.e., mainly four methods popularly

1. Constant-current (CC) Charging: As the name implies we put charging voltage at maximum level.

2. Constant-voltage (CV) Charging: In this case, charging method the battery voltage makes up to full charge at a constant current.

3. Constant-current Constant-voltage (CCCV) Charging: It simply refers towards “Voltage Controlled Charging”. It is quite a simpler approach for charging a battery until the battery outreaches a limited voltage potential where the charger exerts a constant current.

4. Multistage constant-current (MCC) Charging: It is also know a five step charging pattern. In this, at each phase the charging value is set at some constant threshold value.

V. FAST CHARGING STATIONS

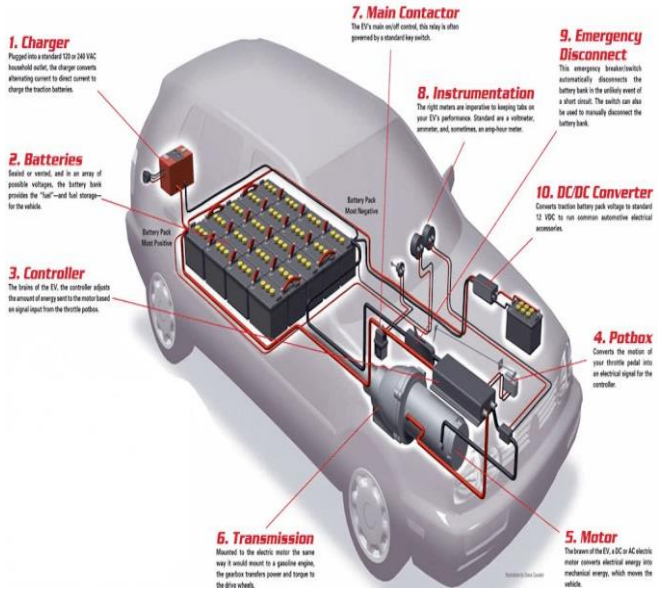

Fig-1: Type of battery used in electric vehicle and their parameters.

To minimize the driving scaleanxiety and therefore to hold up a higher growth of the perforation of EVs globally there is anecessarily requirement in system of a charging i.e., up to change the present surviving oil stations. The main factor is to minimize the time of charging from 6-7h to 30min. For this, we require a higher power from the grid. For such a charging station, the connection needs a large capital expenditure and it could easily overcharge the distribution network. In order to further minimize, in typical operation, during daytime, the EV batteries can be recharged from the radiate energy possibly not present the EV batteries can be charged from the grid. The top up familiar technologies taken used in a Fast charging systemizes are multifaceted converters and that have a lower current harmonic distortion and high power density. Currently, there are many key automobile players in India which are Mahindra electric, Tata motors, Maruti Suzuki, Honda, Hyundai, Nissan, these are popular for four wheelers but Ashok Leyland, Tata motors, eicher motors are for buses also. For a comprehensive technical specification let's take an example of the new Mahindra ekuv100. If we talk about key notes of Mahindra then presently zoom car associate with Mahindra electric to proffer self driving range of EV cars in Mumbai, Hyderabad, and Mysore. Mahindra Electric is now also connected with Meru cabs to install electric vehicles. Although, LG chem is Mahindra Electric's Lithium battery charging technology partner. For enhancement, manufacture and deployment of EV government of Maharashtra is with MOU. A huge investment planned to develop more in electric vehicle technology. Now, move towards ekuv100 that delivers 54hp and 120Nm of peak torque. The new Mahindra ekUV100 is India's most efficient or affordable as well comes with a 15.9 Lithium-ion battery. It's starting price of Rs 8.25 lakh. It takes approximately 60 minutes to be charged from 0-80 percent. It's claimed range is 147Km.

Fig-2: Grid to Vehicle charging technology

Fig-3: Battery EV Charging Station

VI. CONCLUSION

The present scenario of Electric versatility in India is quite differs from those of the comparing countries currently having larger extents of perforation of electric vehicles and grown market govern. The current contrast is essentially due various factors comparatively public policy, geographical area, and social norms as well as economy is considered a major factor, Heterogeneous development in town areas, increased population, low accessibility of public framework and low economical posses respective barriers to mass scale adoption of e-vehicle.EVs simply put an arrow on point of future transport while in reference of saving this planet from imminent crisis caused by green house effect. Through many different charging techniques Li-ion batteries can be recharged that will be quite complicate the charger architecture and control. The point never be decline that keeping the cost to be minimum for a charger. Where on the other face, the strategies on the charging established on electrochemical imitations, taking into consideration the

internal working of the battery. Currently, the very resilient task for various different rationales in the field of EV charging systems consider the need of standards and the constant developments.

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