ELECTRIC VEHICLE CHARGING INFRASTRUCTURE –A REVIEW

K. Anuradha[1]

1 Department of EEE, JNTU Ananthapuram University, India
anuradhathogata15@gmail.com

ABSTRACT

In this project, we can observe that both electric vehicles and hybrid electric vehicles require an electric vehicle charger to keep the battery full, just like any chargeable device or electronic device.
Electric vehicle charger pulls an electrical current from either 240 v outlet or the grid it's hard wired to and delivers that electricity to the Vehicle, just like any other appliance or device you change by plugging into the wall. Now a days this

Electric vehicle car should be mostly used because of **high fuel cost .For this we can use charging stations for charging the battery of** the car. In this project it has different types of charging stations and different types of batteries should be used.

HISTORY

1st time NIKOLA TESLA Invented the alternating current motor in the year 1887,he passed the way for the invention of the electric vehicle more than a century later. Electric vehicle could make gas-and diesel-powered vehicles absolute by the year 2025, effectively ending the region of the internal combustion engine.

The acceptance of EV in to car culture has already begun with the Tesla Model s winning the motor trend car of the year in 2013. And with electric car sales growing by 81 percent from 2017 to 2018, it seems electric cars could be the norm sooner rather than later. Understanding how an electric vehicle works is actually much simpler than understanding how a gas-or diesel-power car works.

INTRODUCTION

This paper tells about that now a day's most of the peoples use electric This vehicle cars ,because of high cost of fossil fuels in nowadays so that's why , most of the peoples use electric vehicle cars.

WHAT is mean by electric charging station?

Electric cars should run only some period ,after the charging should be low the electric car should go slow .for that in some places electric vehicle charging stations should be used we can go that place and we can charge our vehicle easily .It should be more helpful to us this process is called charging station of electric vehicle.

In this they have mainly two parts charging stations and different types of batteries should be used.

ELECTRIC VEHICLE CHARGING STATION LOGO

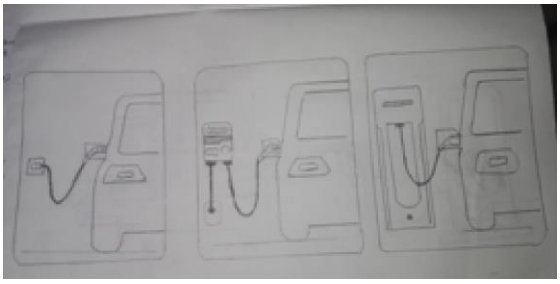
CHARGING SATION:

The above picture shows that the charging station

To charge an electric car, just plug it into a charger connected to the electric grid. Charging occurs through the cars electric vehicle service equipment (EVSE) .Three levels of EVSE exist, each with its own charging speeds and equipment.

- Home charging
- Electric vehicle service equipment (EVSE) home charging
- EVSE DC fast chargers

These are the 3 levels of charging based upon speed and equipment. These are takes different charging hours to take different levels. Nowadays these are the 3 types of the charging levels used. In all over countries electric vehicle service equipment EVSE charging stations should be use..



LEVEL 1: HOME CHARGING

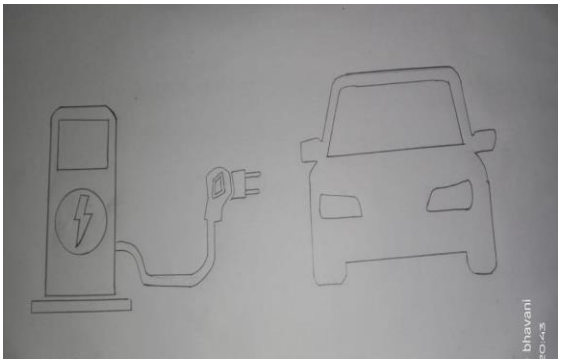
Home charging it is also called as TRICKLE CHARGING. The slowest method of charging your EV at home, using a standard (three prong) 120V plug. it is only recommended in urgent cases, with caution and consultation with electricity providers. Level 1 charging requires no special equipment and is typically done at home .level one chargers take longest time to charge your electric vehicle, averaging about three to five miles per hour of charge.

1. It does not require any installation of additional charging equipment.

2. It can deliver 13 to 16 km of range per hour of charging.

3. Using trickle charge is only recommended in urgent cases when you have low battery charge and cannot drive to a public station or access an ac wall box at home. This is because the use of household electricity may because problems associated with electricity bills and electrical loads.

1. So always use this charge solution with caution and discuss with your electricity provider before first use. Purchasing an ICCB (in cable control box) cable when using trickle charge is recommended, for maximum reliability and peace of mind.



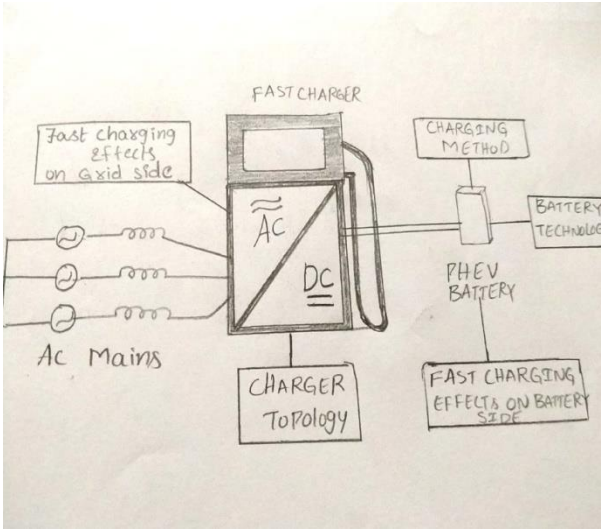
Level 2: EVSE CHARGING OR PUBLIC CHARGING STATIONS

Increasingly convenient thanks to the ever growing network ,these stations can often be located throughout urban centres in particular and allow you to top your battery on the go if you need to travel longer distances. Public charging offers ac charging with a wall box or –in the majority cases – dc fast charging.

These charges use a 240 v plug and typically need to be installed by an electrician. They can be used for either home or commercial charging. Many electric car automakers

provide purchase options for level two EVSES at the time of vehicle purchase, and private companies also offer electric vehicle chargers. Level two chargers are much faster than level 1 charger .offering up to 60 miles of range per hour of charge. They are capable of fully charging an electric car battery in about two hours.a

LEVEL 3: DC FAST CHARGER



DC fast chargers are the charging stations you will see in parking lots around town .they can deliver up to 100 miles of power in about 20 minutes of charging. These highly specialized pieces of equipment aren't compatible with all plugs in hybrid vehicles.

Dc fast chargers can be accessed through payment apps or specific cards set up for use at public charging stations.

1. It can provides charging power above 50 kw through a voltage above 450 v and current up to 125 A.

2. Is capable of charging from 20 to 80 %of charge in approximately 40 minutes.

3. Use of dc charge should keep to a minimum in order to help prolong high voltage battery life.

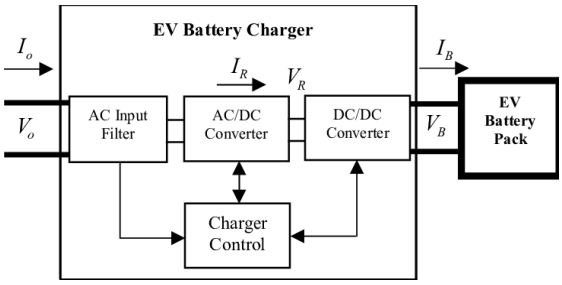
Levels	Ranges	Applications
Home Charging	2 To 5 Miles Per Hour	Homes Multi Unit Resedentials
Public Charging	10 To 30	Multi Unit Resedentials
Dc Fast Charging	150 To 350	Public Outside Places

The above figure shows the types of EV charging and differences and its applications.

Ac versus dc charging

The national grid delivers AC current, but electric cars need DC current to charge their battery pack. An ac charger supplies that EV s

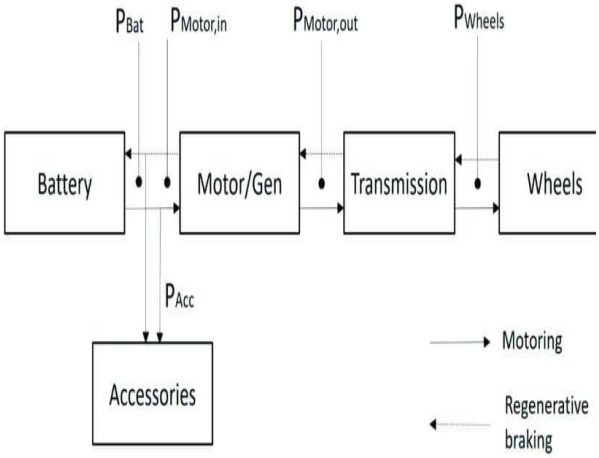
onboard charger, which them converts the ac Power to dc allowing the battery to charge. The size of the onboard charging device is constrained by space. Due to this the amount of power they can deliver to the battery is relatively.



This means that charging is typically slower.

A dc fast charger bypasses the onboard charging device, supplying power directly to the EVs battery. The DC charger is external to the car, so it isn't constrained in size or cost. It means that charging is typically muchfast.

Block diagram of electric vehicle :



- The above shown is a biock diagram of electric vehicle.
- It consists of a battery, motor , generator,transmission,wheels and accessories
- Battery stores the energy .
- Motor converts electrical energy into mechanical energy.
- Generator,converts mechanical energy into electrical energy.
- Transmission can transmit power from one form to another form.
- Wheels in the form of mechanical energy can be rotated.
- Accessories include batteries and other storage elements.

The above block diagram shows that the electric vehicle these are considered as mainly two types

- Regenerative braking
- Motoring
- Induction motor
- Inverter

INVERTER:

Batteries can store only dc electricity, but many electric cars run on ac electricity. The inverter takes the dc electricity and converts the ac electricity for the electric motor use. The inverter

controls the frequency of the ac sent to the electric motor, which essentially means the inverter controls the speed of the vehicle. It acts as the brain of the system, directing the motor and other components.

INDUCTION MOTOR:

The induction motor is an AC motor, means it runs on alternating current electricity. This alternating current creates a rotating magnetic field within the induction motor which turns is based on the alternating current frequency sent from the inverter.

REGENERATIVE BRAKING:

It is a valuable feature of many electric cars. Regenerative braking allows the vehicle to recharge while deaccelerating by using the induction motor as a generator. The induction motor turns into a generator when the wheels and drive train rotate faster than does the induction motor. That electricity is then sent back to the battery pack for later use.

Conclusion:

This report discusses about the potential need for electric vehicles (EV),charging station infrastructure and its challenges for the Indian scenario .With increase liberalisation ,privatization and expansion of distributed and renewable power generation of Indian electricity market, transmission and distribution, as well as market processes related to the allocation of energy and energy mix are undergoing an evolutionary development with improved efficiency and reliability. A structured analysis of respective parameters is performed for the commercial scopes of ev in existing energy marketing based on regulatory concerns are considered to outline a scenario where an aggregator controls the charging of ev provides ancillary grid services. Searching charging stations for electric vehicles is an important issue for drivers which need the implementation of smart charging infrastructure network selecting the location for installing ev charging stations is important to ensure ev adoption and also to address some of the inherent risks such as battery cost and degradation, economic risks, lack of charging infrastructure, risky maintenance of EV ,problems of its integration in smart grid, range anxiety,

auxiliary loads and motorist attitude.

LEVELS	RANGES	APPLICATIONS
HOME CHARGING	2 TO 5 MILES PER HOUR	HOMES MULTI UNIT RESEDENTIALS
PUBLIC CHARGING	10 TO 30	MULTI UNIT RESEDENTIALS
DC FAST CHARGING	150 TO 350	PUBLIC OUTSIDE PLACES