



**VIT<sup>®</sup>**  
**BHOPAL**

SCHOOL OF ELECTRICAL & ELECTRONICS  
ENGINEERING

# Charging station for electric vehicles:

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# *Contribution*

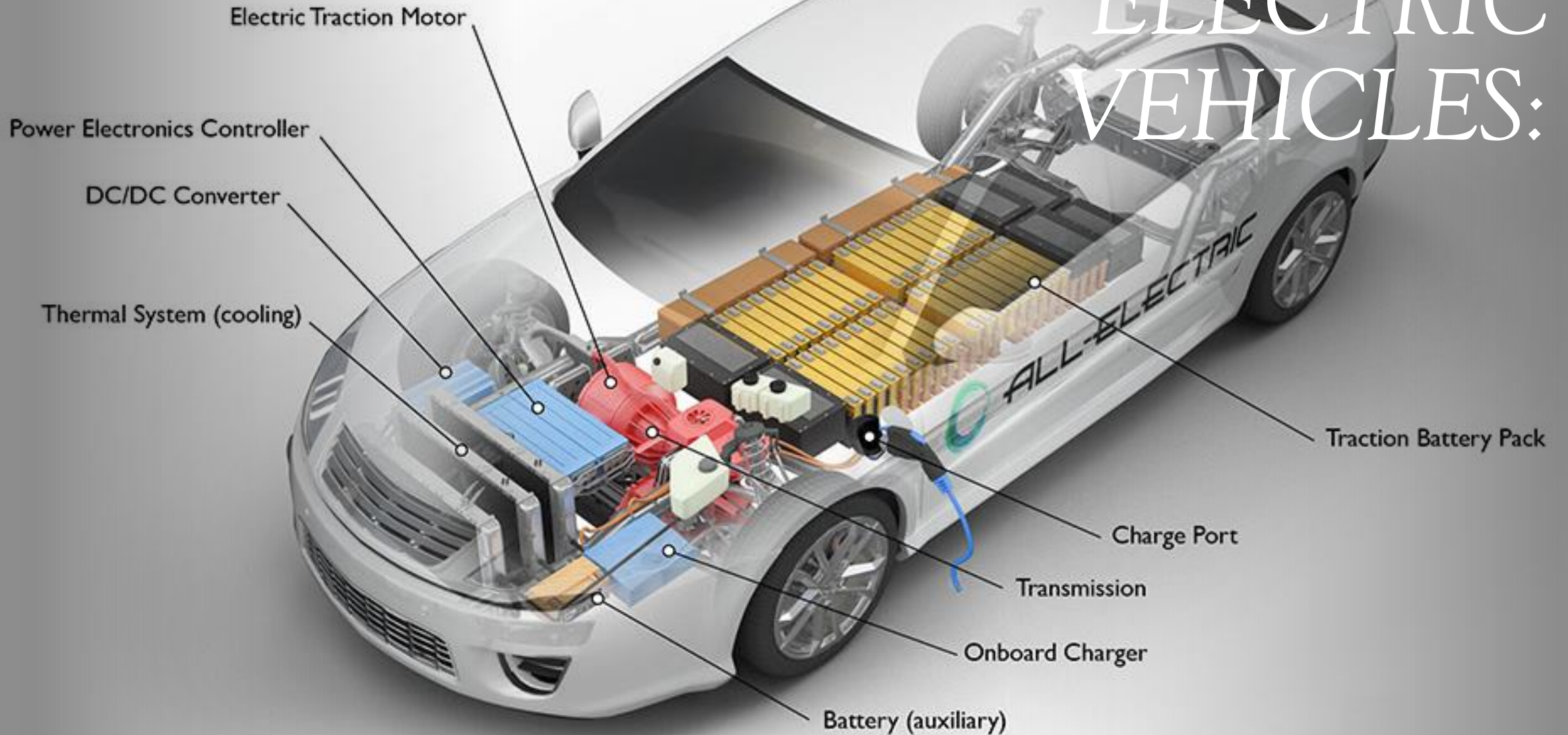
- 1) Nilesh: **Research and findings.**
- 2) Radhika Gurjar : **designing and visualization.**
- 3)Anuradha Tiwari : **Calculation and components finding.**
- 4) Deepshikha Sen: **Simulation.**

# *Charging station for electric vehicles:*

◦ An electric vehicle charging station, also called EV charging station, electric recharging point, charging point, charge point, electronic charging station (ECS), and electric vehicle supply equipment (EVSE), is a machine that supplies electric energy for the recharging of plug-in electric vehicles—including electric cars, neighborhood electric vehicles and plug-in hybrids.



# ELECTRIC VEHICLES:



# Motivation:

1. Electric vehicles now include cars, transit buses, trucks of all sizes, and even big-rig tractor trailers that are at least partially powered by electricity.
2. Electric vehicles are saving the climate — and our lives.
3. Electric vehicles have a smaller carbon footprint than gasoline-powered cars, no matter where your electricity comes from.
4. Planning now by states and utilities to build infrastructure for charging electric vehicles will go a long way.

# Objectives:

- Steady of different type of charging station.
- Simulate the charging station using MATLAB.
- Develop the prototype .

# *EV Vehicles need:*



## Hydrogen fuel cell vehicle

Starts at: €60,000

Range: 320-405km/200-250 miles

Time to refuel: 3-4 minutes



## Electric vehicle

Starts at: €21,000

Range: 160-500km/100-310 miles

Time to refuel: 30 minutes to 12 hours



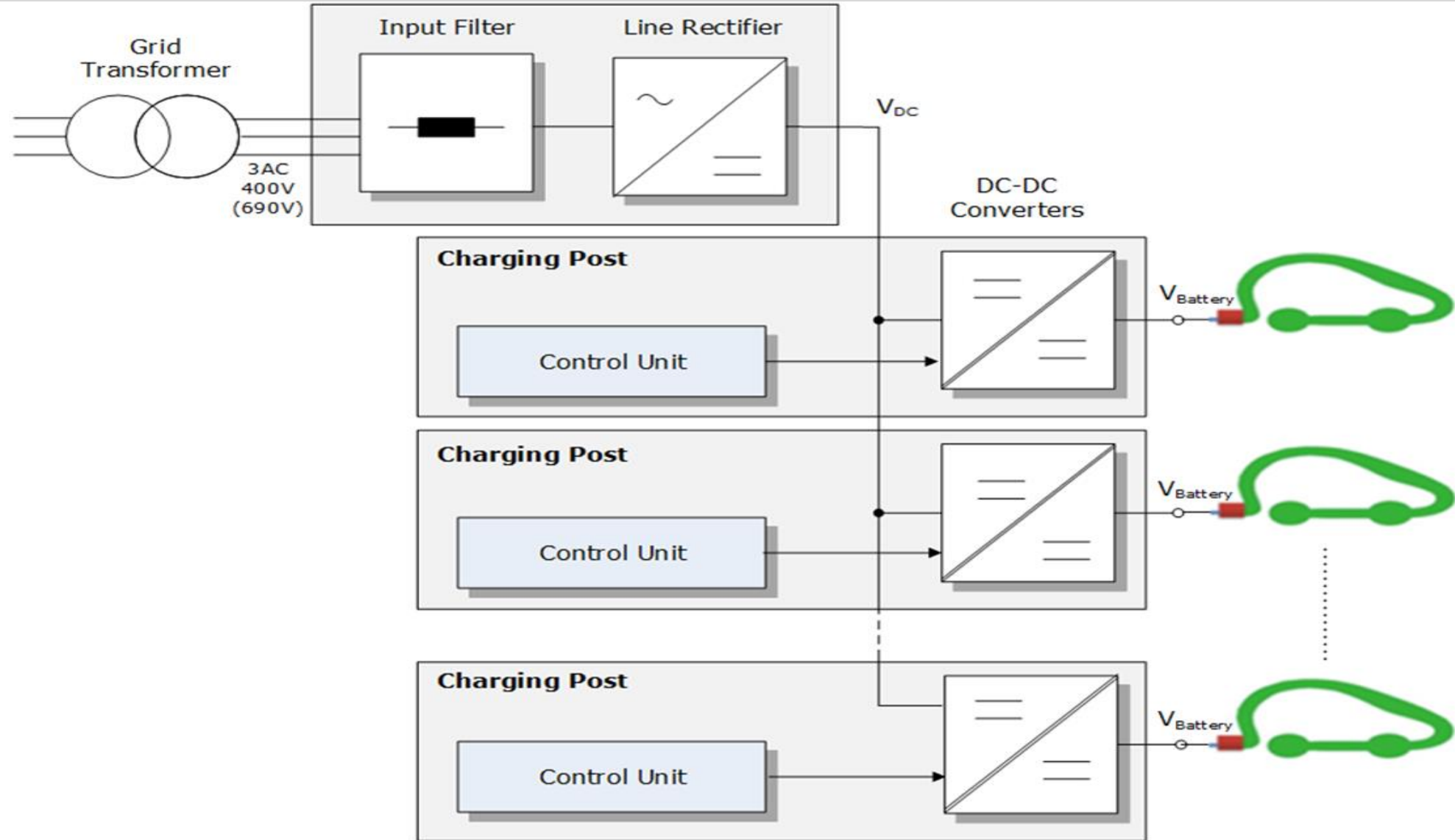
## Petrol or diesel vehicle

Starts at: €8,000

Range: 480-640km/300-400 miles

Time to refuel: 2-3 minutes

Problem Formulation





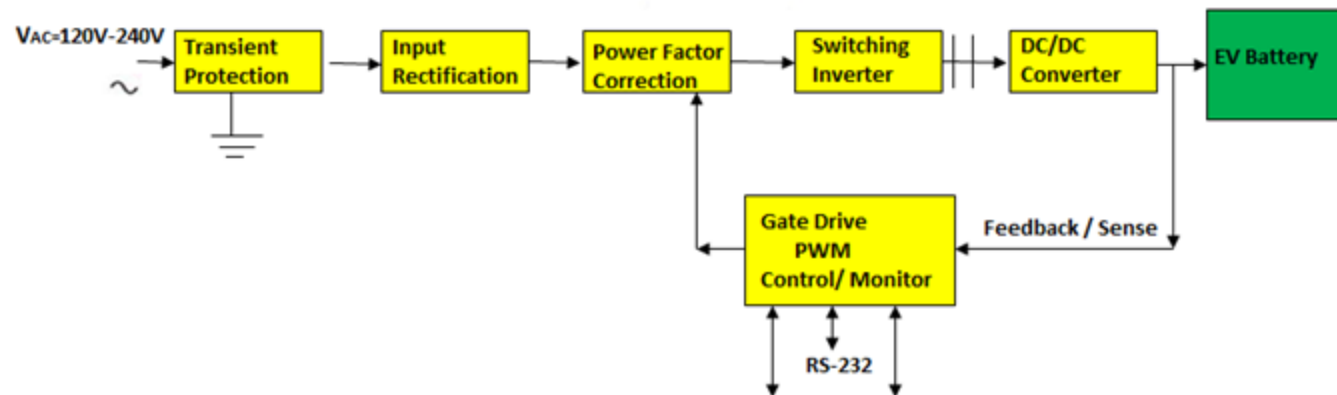
# *Classification of EVSE component:*

- **Physical components:** such as internal electronics, controllers, cord, EV-compatible plug and telecommunications devices to share data and enable network connections.
- **Software:** applications to manage the charging, billing, driver access, and administration of an EVSE program.
- **On-going service:** to maintain physical and software components as well as provide customer service to both EVSE owners and their driver constituents.



# Physical component

- Level 1 charging works from a single phase AC power outlet and is suitable for private, domestic installations and these do not need authentication and billing.
- Level 2 charging stations may use either single phase or three phase AC power from the grid.
- Level 3 the electricity generating utility must provide a dedicated supply line capable of delivering the very high currents demanded.



# *EV charger: mainly it is three types*

	Level 1	Level 2	Fast charge
Voltage	120 V	208 or 240 V	200 to 450 V
Current type	AC	AC	DC
Useful power	1.4 kW	7.2 kW	50 kW
Maximum output	1.9 kW	19.2 kW	150 kW
Charging time <sup>a</sup>	12 h <sup>a</sup>	3 h <sup>a</sup>	20 min <sup>b</sup>
Connector	J1772	J1772	J1772 Combo, CHAdeMO and Supercharger

a. Charging time of a completely discharged 16-kWh battery at useful power.

b. Charging time to 80% charge, i.e., 12 kWh. Fast charging cannot be sustained to a full charge.



## Level 3 DC fast charger



### Specification:

input: 380-440V Three Phase

output: 450Vdc/750Vdc

output power: 20KW to 100KW

## *Fast dc charger: outcomes:*

- Large office complexes may need to think about employees who require electric charging points for vehicles they drive to work. Currently 75% of EV users are unable to charge their cars at work in the UK.
- Businesses with an electric commercial fleet – such as a logistics company, for example – will require commercial electric car charging stations to accommodate large numbers of company-owned vehicles.
- Companies based around individuals driving a fleet of electric cars that are individually owned – such as a taxi firm – could benefit from offering electric vehicle fleet charging on the premises.

# SAFETY:

Although the rechargeable electric vehicles and equipment can be recharged from a domestic wall socket, a charging station is usually accessible to multiple electric vehicles and has additional current or connection sensing mechanisms to disconnect the power when the EV is not charging.

There are two main types of safety sensor:

- Current sensors which monitor the power consumed, and maintain the connection only if the demand is within a predetermined range. Sensor wires react more quickly, have fewer parts to fail and are possibly less expensive to design and implement. Current sensors however can use standard connectors and can readily provide an option for suppliers to monitor or charge for the electricity actually consumed.
- Additional physical "sensor wires" which provide a feedback signal that require special (multi-pin) power plug fittings.

# *Conclusion*

This presentation proposes to the effectiveness of EV Charging Station where we can do fast charging, at same time we can charge one and more than electrical vehicle 30-40 minute time duration.

On the conclusion point:

- 1) Changed behavior is important for transition towards e-mobility.
- 2) Customised regional and city planning for e-mobility.
- 3) Develop smart charging systems - V2G.

# References

- ([https://www.researchgate.net/publication/320410391\\_A\\_Study\\_of\\_Electric\\_Vehicle\\_Charging\\_Station\\_Installation\\_Progress\\_in\\_Malaysia](https://www.researchgate.net/publication/320410391_A_Study_of_Electric_Vehicle_Charging_Station_Installation_Progress_in_Malaysia)) proposed methodology.
- (<http://www.eai.in/blog/2018/12/components-of-ev-charging-infrastructure.html>) component of EV charging.
- (<https://pdiwan.medium.com/slow-fast-and-super-ev-chargers-conundrum-d35ea0da5a87>) DC fast charging.
- Boook: Power Electronics by Ps bimbhra ( design of convertor)
- Matlab for simulation

No.	Particulars	duration	outcomes
1	Module 1( Give name such as literature survey with detail )	1-14 march 2021	
2	Module 2( planning )	15-30 march 2021	
3	Module 3( Design )	30 march-20 April 2021	
4	Module 4( Implementation )	20-30 April 2021	
5	Module 5( Validation )		

## ROAD MAP:





*Thank you*