iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** I **Month of publication:** January 2020

DOI: http://doi.org/10.22214/ijraset.2020.1103

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 8 Issue I, Jan 2020- Available at www.ijraset.com

Why Electric vehicle? A Big Question in the 21st Century

Aniket Magar[1] Atharva Hasabnis[2]

Abstract: ***In the current era of globalisation, Development in the mechanical field is increasing rapidly. The advent of electric vehicle reflects the above statement. The question remains about the adaptation of electric vehicles over normal vehicles (Having internal combustion Engine). Because of the issues brought about by the petrol and diesel engine on nature and people, the car industry has gone to the electrical fuelled vehicle. This article will suggest an answer to the above topic and also why it's essential. Also, the report gives a portion of the points of interest and burdens of the electric vehicle. What's more, a concise future perspective on the innovation is given.***

Keywords: IC Engine, BS4, EV batteries, Electric Vehicle, BS6

I. INTRODUCTION

The 1960s and 1970s saw a requirement for alternative fueled vehicles to lessen the issues of fumes emanations from interior burning motors and to diminish the reliance on imported outside unrefined petroleum. During the years from 1960 to the present, numerous endeavors to produce down to earth electric vehicles happened and keep on happening. The reason for this report is to portray the innovation used to deliver an electric vehicle and clarify why the electric motor is superior to the internal combustion engine. It incorporates reasons why the electric vehicle developed quickly and the explanation it is a need to better the present reality. The report portrays the most significant parts in an electric vehicle and crossover vehicle. It looks at the electric to the half breed and inward ignition motor vehicle. It likewise incorporates the eventual fate of the electric vehicle.

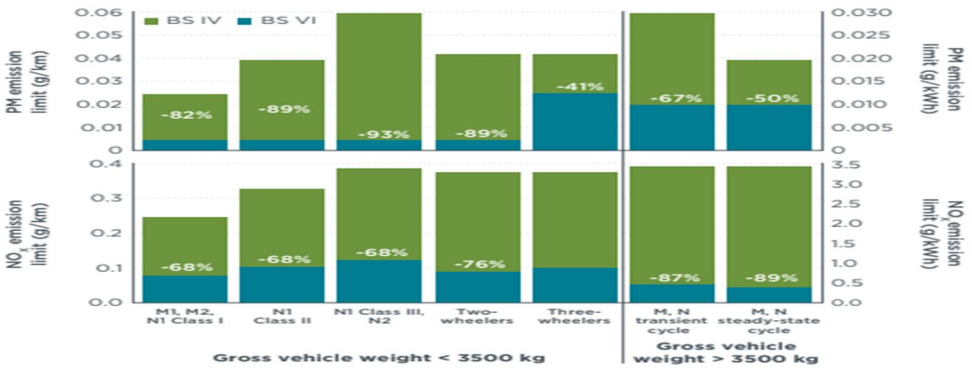
The general effect of the electric vehicle at last advantages the individuals. Contrasted with gas fueled vehicles, electric vehicles are viewed as ninety-seven percent cleaner, creating no tailpipe emanations that can put particulate issue into the air. Particulate issue, cancer-causing agents discharged into the air by gas-controlled vehicles, "can expand asthma conditions, just as aggravate respiratory frameworks". The paper starts with a past filled with the electric vehicle, explicitly the lows and highs of generation and the explanations behind the change. The following segment gives a specialized portrayal of an electric vehicle, including the parts, their capacities, and the hypothesis of activity. The accompanying segment portrays the half and half vehicle, including parts, their capacities also, the hypothesis of activity. In light of this understanding, I at that point look at the internal combustion engine, the hybrid engine, and the electrical engine as far as proficiency, speed, increasing speed, support, mileage, and cost. The paper closes with areas on the focal points and hindrances of the electric vehicle and its future.

II. HISTORY OF ELECTRIC VEHICLES

The development of the electric vehicle is credited to different individuals, including the Hungarian innovator of the electric engine, Ányos Jedlik, Vermont metal forger Thomas Davenport, Professor Sibrandus Stratingh of Groningen, the Netherlands. The development of improved battery innovation, including endeavors by Gaston Plante in France in 1865, just as his kindred comrade Camille Faure in 1881, prepared for electric autos to thrive in Europe.

III.EFFECT OF IC ENGINE TILL DATE

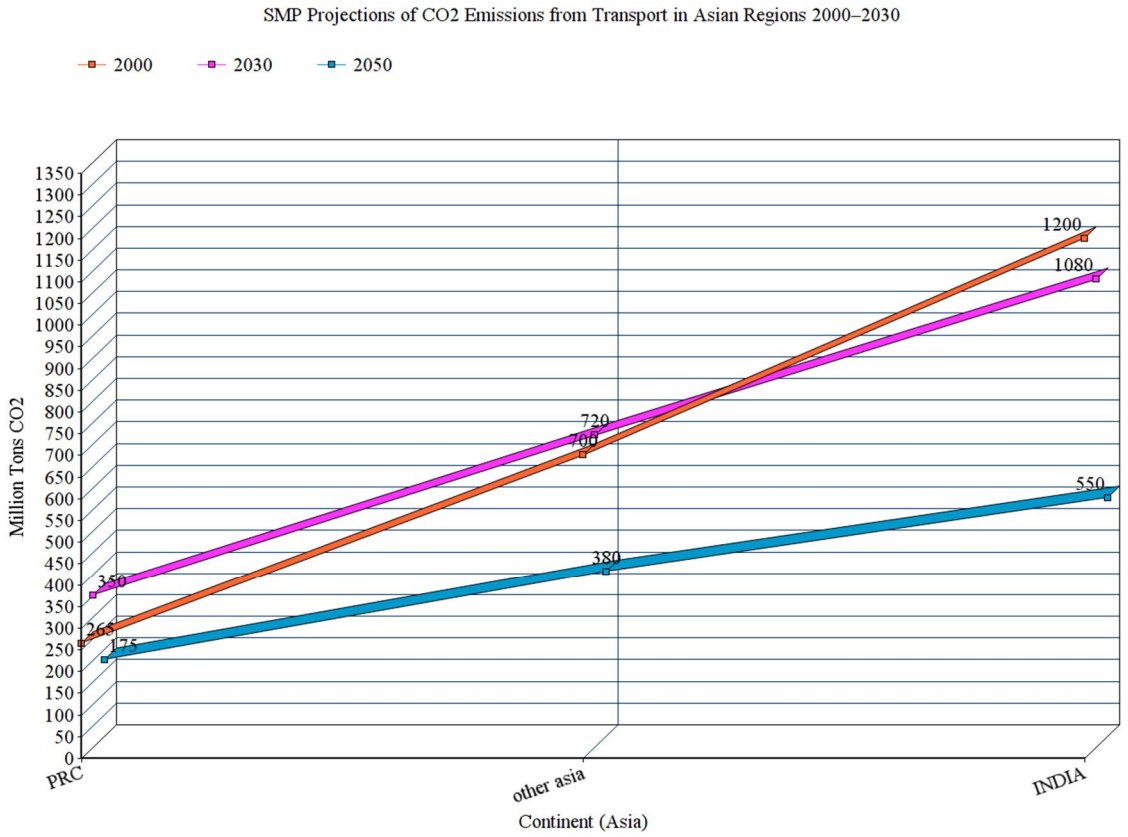
A. NO_x and PM emissions through BS4 and BS6 Engine



According to Indian BS6 standards the above statistics were recorded for vehicles under 3600 kg.

©IJRASET: All Rights are Reserved

B. CO_2 emissions through vehicles in Asian countries



With a careful perusal from the given statistics one can decipher that if the vehicles used in the Asian countries continue to emit CO2. (Here, SMP:- Suspended particulate matter)

C. Health Issues Caused Due To The Pollutants From Transport

Table 4.1. Summary of health studies of transport-related air pollution

Health outcome	Population studies		Experimental studies		Comments
	Pollutant	Evidence	Pollutant	Evidence	
Mortality	Black smoke Ozone PM2.5	Some Some Some	None	None	No experimental studies
Respiratory diseases (non-allergic)	Black smoke Ozone Nitrogen dioxide VOCs	Some Some Some Some	CAPs Diesel Nitrogen dioxide Ozone	Strong Strong Strong Strong	Strong experimental evidence for inflammatory effects for several pollutants at relatively high concentrations
Respiratory diseases (allergic)	Ozone Nitrogen dioxide VOCs	Some Some Some	PM CAPs Diesel Nitrogen dioxide	Some Some Strong Some	Strong experimental evidence for allergy enhancement by DEPs; growing similar evidence for CAPs (experiments use relatively high concentrations of pollutants)
Cardiovascular diseases	Black smoke	Some	CAPs	Some	Some experimental evidence for cardiovascular effects
Cancer	Nitrogen dioxide Diesel exhaust	Some Some	Diesel exhaust VOCs	Some Equivocal	None
Reproductive outcomes	Nitrogen dioxide Carbon monoxide Sulfur dioxide Total suspended particles	Equivocal Equivocal Equivocal Equivocal	Diesel exhaust	Some	None

The above table represents the Health problems caused due to the pollutants and the evidence available for the same.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 8 Issue I, Jan 2020- Available at www.ijraset.com

IV. COMPARISON BETWEEN DIFFERENT VEHICLES

Following is the comparison between Internal Combustion Engine (ICE), Hybrid Vehicle (HV) and Electric Vehicle (EV).

A. ICE vs EV

Parameters	ICE	EV
Emissions	As these vehicles require fuel to start the emissions of gases (Co_2 and No_x) is increased and has led to serious problems like the Air pollution	EV's don't require any fuel to start they are totally dependent on batteries and motors, Hence they don't produce any emission
Travelling Distance	Approximately (550-600 km) with full petrol	Approximately (300-400 km) when fully charged
Acceleration (Average)	Less acceleration as compared to EV	Instant acceleration
Maintenance	High maintenance cost as many parts are on operation when the vehicle starts	less maintenance cost
Milage	Can go over 300 miles before refuelling. Typically get 19.8 miles per gallon (mpg).	Typically get 48 to 60 mpg.
Fuelling points	High amount of fuelling stations available	stations available for charging are less
Availability	Oil is Limited	Numerous ways of generating electricity

B. HV vs EV (Pros and cons)

Hybrid Vehicle

Pros	Cons
Since hybrid vehicles can run on a combination of gas and power, they make less contamination than normal vehicles	hybrid vehicles commonly cost more than conventional vehicles at the hour of procurement, so while you will get a good deal on gas over the long run, you'll have a higher in advance expense
In a hybrid vehicle, the gas motor isn't answerable for running the vehicle all alone like it would be in a traditional vehicle, so motors in hybrid vehicles will in general be little, lighter, and increasingly productive	Most hybrid vehicles are intended for economy, not execution — so a hybrid may not quicken very as fast or offer a similar sort of execution as a conventional vehicle

Electric Vehicle

Pros	Cons
Unadulterated electric vehicles run exclusively on power and don't discharge any emanations, so driving one will decrease your carbon emissions	Unadulterated electric vehicles will in general cost much more than conventional and crossover autos at the hour of procurement, so while you'll save money on gas over the long haul, you'll be paying more forthcoming
Jettisoning the gas pump can spare you a chunk of change (charging your electric vehicle isn't free, yet the expense is commonly negligible contrasted with topping off a gas tank)	Since they're controlled by power and don't have back-up fuel stores, they for the most part won't go the extent that half and half or conventional vehicles before waiting be energized

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 8 Issue I, Jan 2020- Available at www.ijraset.com

C. Cost of ICEV, HV & EV

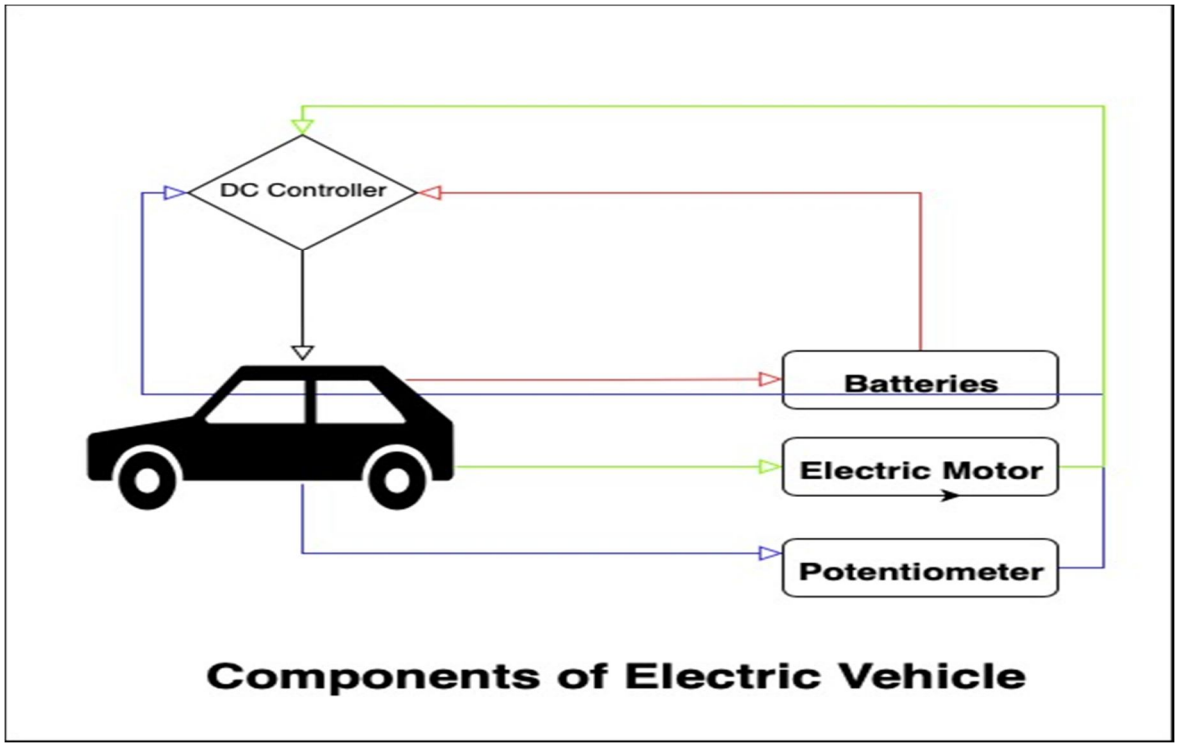
Internal combustion engine vehicle	Hybrid Vehicle	Electric Vehicle
15000-18000	20000-25000	50000$-More

V. DESCRIPTION AND COMPONENTS OF ELECTRIC VEHICLES

The electric vehicle (EV) is impelled by an electric engine, controlled by Rechargeable battery packs, as opposed to a fuel motor. As a rule, electric vehicles are made by changing over a combustion engine.

The main components in an EV are:-

1) Electric motor
2) Rechargeable battery
3) Controller



A. Description of Parts

1) Potentiometer: It is round fit as a fiddle and it is snared to the accelerator pedal. The potentiometer, additionally called the variable resistor, gives the sign that tells the controller how much power is it expected to convey.

2) Batteries: The batteries provide power for the controller. Three types of batteries: lead acid, lithium ion, and nickel-metal hydride batteries. Batteries range in voltage (power).

3) DC Controller: The controller takes control from the batteries and conveys it to the engine. The controller can convey zero power (when the vehicle is halted), full power (when the driver floors the accelerator pedal), or any power level in the middle. In the event that the battery pack contains twelve 12-volt batteries, wired in arrangement to make 144 volts, the controller takes in 144 volts direct current, and conveys it to the engine in a controlled manner. The controller peruses the setting of the Accelerator pedal from the two potentiometers and manages the power in like manner. In the event that the accelerator pedal is 25 percent of the route down, the controller beats the power so it is on 25 percent of the time and off 75 percent of the time. In the event that the sign of the two potentiometers are not rise to, the controller won't work.

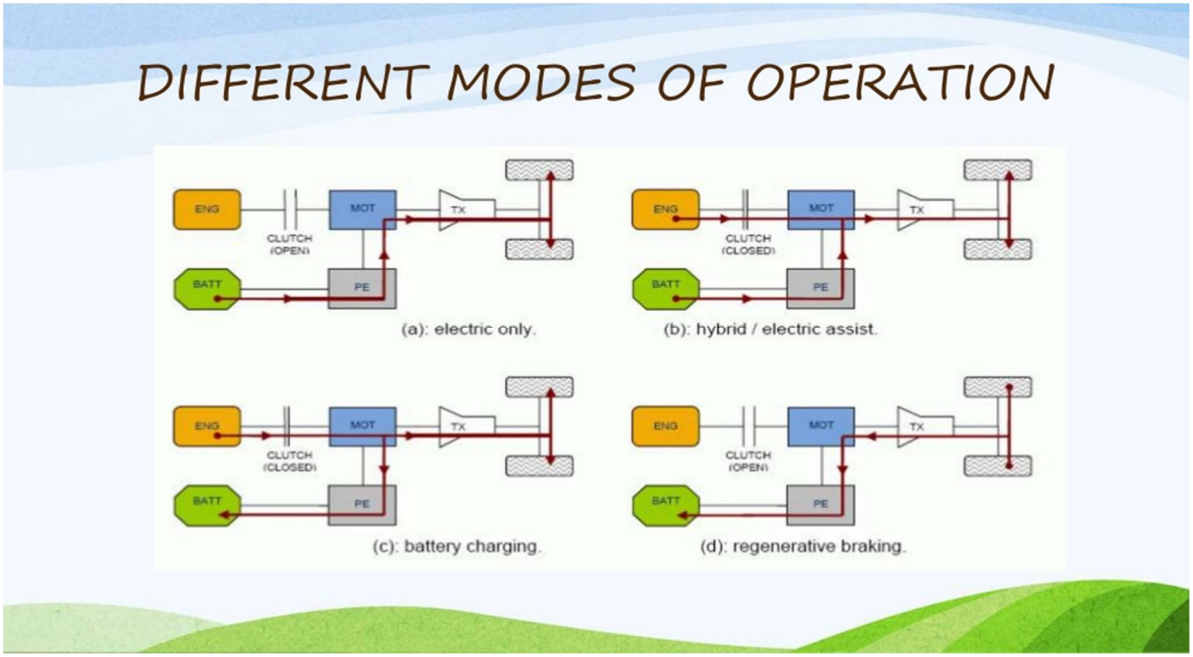
4) Motor: The motor receives power from the controller and starts a transmission. The transmission then turns the wheels, causing the vehicle movement.

©IJRASET: All Rights are Reserved

B. Operation

At the point when the driver steps on the pedal the potentiometer enacts and gives the sign that tells the controller how much power it should convey. There are two potentiometers for safety. The controller peruses the setting of the quickening agent pedal from the potentiometers, controls the power in like manner, takes the power from the batteries and what's more, conveys it to the engine. The engine gets the power (voltage) from the controller and utilizes this capacity to pivot the transmission.

The transmission at that point turns the wheels and makes the vehicle push ahead or in reverse. On the off chance that the driver floors the accelerator pedal, the controller conveys the full battery voltage to the engine. On the off chance that the driver takes his/her foot off the quickening agent, the controller conveys zero volts to the engine. For any setting in the middle of, the controller cleaves the battery voltage, a huge number of times each second to make a normal voltage somewhere close to 0 and full battery pack voltage.



Above is a diagram which explains the following processes:

1) When only electric vehicle is considered.
2) When Hybrid vehicle is considered.
3) When the battery is charging.
4) When battery is used.

VI. ADVANTAGES AND DISADVANTAGES OF ELECTRIC VEHICLE

SR NO.	ADVANTAGES	DISADVANTAGES
1.	As these vehicles can be charged electrically there'll be no gas required hence no gas emissions.	Electric fuelling stations are still in the advancement stages. Not a great deal of spots you go to consistently will have electric fuelling stations for your vehicle, implying that in case you're on a long outing and come up short on a charge, you might be stuck where you are.
2.	These vehicles can be fuelled at exceptionally modest costs, and numerous new vehicles will offer incredible motivating forces for you to get incentives once more from the legislature for becoming environmentally viable.	Electric autos are restricted by range and speed. The majority of these vehicles have go around 50-100 miles and should be energized once more. You can't utilize them for long voyages starting at now, in spite of the fact that it is relied upon to improve in the future.

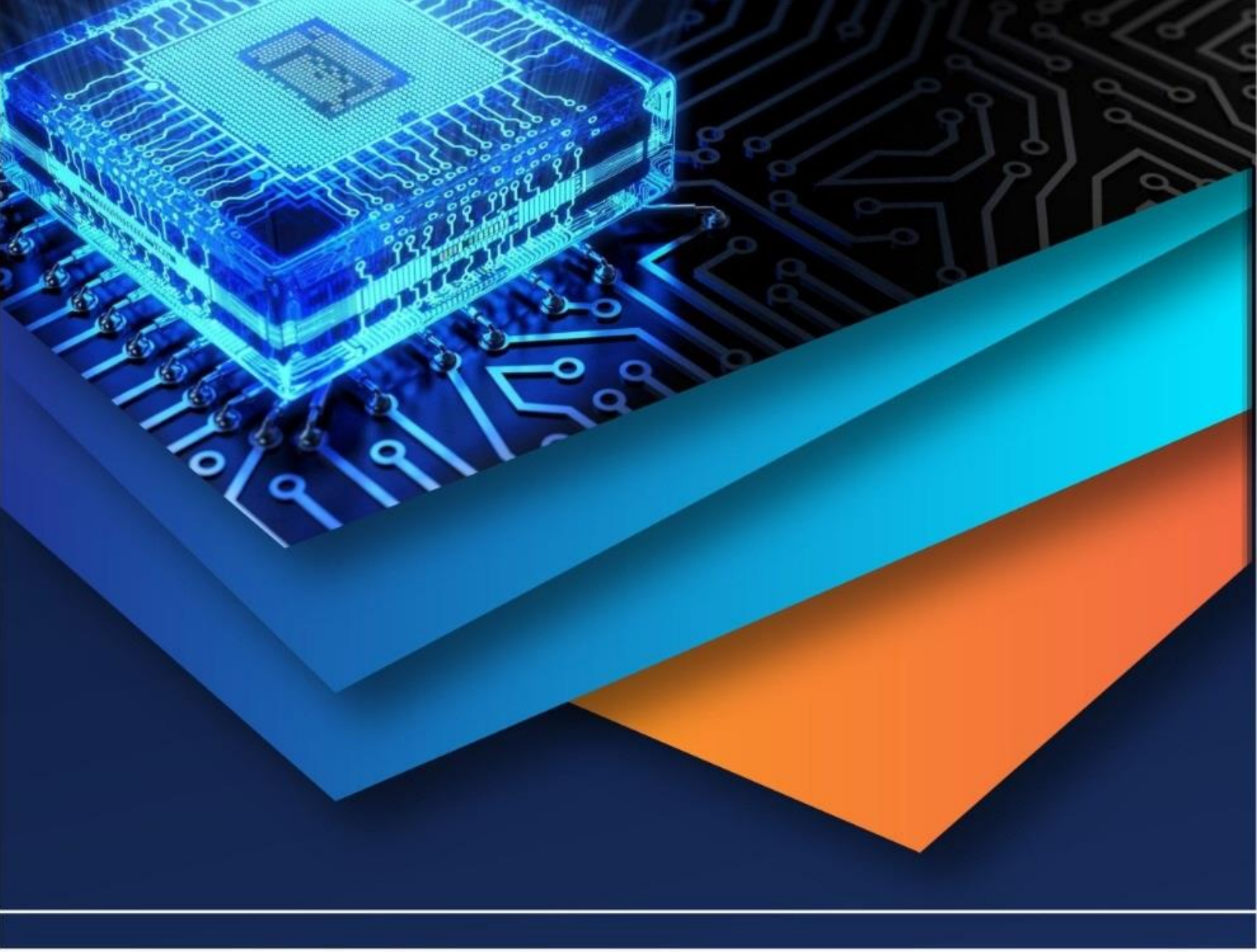
©IJRASET: All Rights are Reserved

3.	Electric vehicles are 100 percent eco-friendly as they run on electrically fueled motors. It doesn't discharge harmful gases or smoke in nature as it runs on clean vitality source. They are stunningly better than hybrid vehicles as half breeds running on gas produce emanations.	While it takes hardly couple of minutes to fuel your gas controlled vehicle, an electric vehicle take around 4-6 hours to get completely energized. In this way, you need committed force stations as the time taken to revive them is very long.
4.	Electric autos experience same testing techniques test as other fuel controlled vehicles. On the off chance that an accident occurs, one can expect airbags to open up and power supply to cut from battery. This can forestall you and different travellers in the vehicle from getting serious injuries.	The majority of the electric vehicles accessible today are small and 2 seated in particular. They are not implied for the whole family and a third individual can make venture for other two travelers bit awkward.
5.	Electric autos runs on electrically controlled motors and henceforth there is no compelling reason to grease up the motors. Other costly motor work is a thing of the past. In this manner, the support cost of these vehicles has descended. You don't have to send it to support station frequently as you do an ordinary gas fueled vehicle. Hence, low maintenance cost.	Contingent upon the sort and utilization of battery, batteries of practically all electric vehicles are required to be changed each 3-10 years.
6.	Electric vehicles mitigates noise pollution as they are a lot calmer. Electric engines are equipped for giving smooth drive higher speeding up over longer separations.	As electric autos need capacity to energize, urban communities previously confronting intense force deficiency are not appropriate for electric vehicles. The utilization of more force would hamper their day by day power needs.

REFERENCES

[1] Indian Bharat Stage VI Emission Standards (ICCT Policy Updates). Available: https://theicct.org.
[2] Rony Argueta (University of California Santa Barbara), " A Technical Research Report: The Electric Vehicle". (2010)
[3] Michal Krzyzanowski, Birgit Kuna-Dibbert and Jürgen Schneider (WHO Europe), "Health effects of transport-related air pollution".
[4] Sushovan bej, "Electric vehicles" (https://www.slideshare.net/SushovanBej/electric-vehicles-54609481).

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)