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CARBON FOOTPRINT ANALYSIS OF ELECTRIC VEHICLES AND INTERNAL COMBUSTION ENGINE VEHICLES

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ABSTRACT-

Internal combustion engines run on fossil fuels, which cause many problems for the environment and humans. Electric scooters have many advantages over internal combustion engine vehicles. As a result, the automotive industry is shifting to electric vehicles (EVs). The development of electric scooters has been seen for many years and is still being researched to improve their performance. This article provides a comparison of electric scooters and internal combustion engine vehicles. The article also demonstrates the advantages and disadvantages of electric vehicles. In addition, to analysis, the carbon footprint of electric vehicles compared with internal combustion engine vehicles is discussed

Keywords: Comparison, Effective, Electrical Vehicles, Future scope, Internal combustion Vehicle

INTRODUCTION :

To the same end, this article discusses better options for future bikes; the Performance and performance of electric vehicles compared to petrol vehicles. The advantages and future possibilities are also discussed in the following sections. Due to the increase in emissions of harmful gases in the last year of 1990, it is necessary to replace bike fuel. The most common gases are carbon dioxide and carbon monoxide. These gases have positive effects on the environment and even humans. In the 1960s, many attempts were made to produce electric bikes to reduce gasoline consumption from foreign countries. Electric Vehicles (EVs) are environmentally friendly and produce less pollution. Electric vehicles are considered to be 97% cleaner than gasoline vehicles. Electric vehicles benefit people in many ways. The EV has a high initial cost but a very low maintenance cost. Bikes using gasoline have caused gas problems for global warming and greenhouse gases. Electric bikes are clean

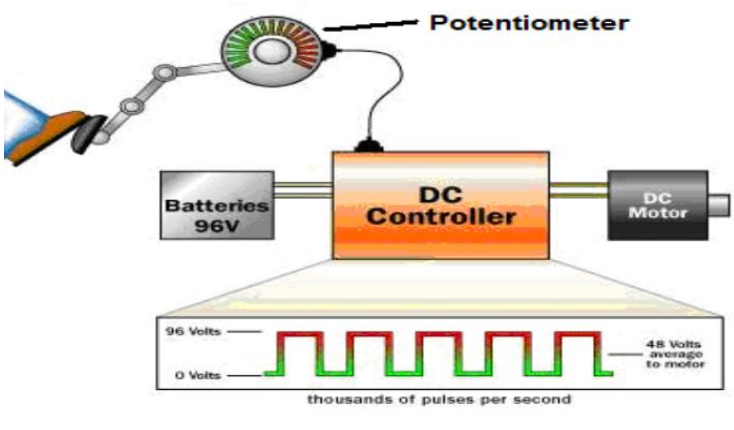
Electric vehicle :

Electric Vehicle is mainly run by an electric motor. Battery packs are used to provide sufficient supply to the motor. Battery packs are usually rechargeable; which can be charged by renewable energy. Most electric cars same as gasoline cars, but rechargeable packs are used rather than internal combustion engines. Electric cars are considered silent cars. Electric Vehicle mainly consists of three elements.

- Electric motor
- Rechargeable battery packs
- Control system

The electric motor gets power from the controller of the vehicle. The motor is further connected to the wheels, due to which wheels rotate. The system is shown in Figure 1. The controller of the Vehicle is connected to the battery packs, potentiometer, and DC motor. The controller is operated from the current coming from battery packs. The power is finally provided to the dc motor and which transmits it to rotate the wheels.

Fig 1- Electric vehicle system



Operation of EV:

As shown in Figure 1, when the driver accelerates the vehicle; resistance change occurs in the potentiometer. Potentiometer is directly connected to the controller. Therefore, gives a signal to the controller. The controller will decide how much power to provide, according to a program stored. Proper power regulation has been done by the controller only. Appropriately controller gives the signal to the battery to get the power to deliver to the motor. The power then transmits to the wheels through the motor. The main important role is played by the controller only, which decides how much power to take from the battery to deliver. If one presses the full pedal, the controller will take full voltage from the battery to the motor. And if one takes off his/her leg from the pedal, the controller will take zero voltage from the battery. Thus, EV is running.

Advantages of Evs

Environmentally friendly: Electric bikes do not generate emissions because they do not use fuel for combustion. Driving an electric bike can be cleaner, as bikes using fossil fuels pollute the environment more.

Energy Potential: Electric bikes use renewable energy, old cars use fossil fuels, and reduce fossil fuels worldwide. The is quieter and smoother on the go: the driving force is noticeably smoother. Since they do not have high speeds, they are quiet and do not make noise.

Cost-effective: electricity is cheaper than fuels such as gasoline and diesel, and prices are constantly changing. Battery charging is cost-effective when using solar power at home.

Less maintenance: Because electric bikes have fewer moving parts, they wear and tear less than conventional cars. It is also easier and cheaper to maintain than conventional engines.

Government incentives: Governments around the world are offering tax breaks to encourage EV drivers as part of green initiatives.

Disadvantages of Evs

High starting price: EVs are still very expensive and many buyers find them cheaper than conventional bikes.

Restrictions on toll booths: People who have to travel long distances worry about not finding enough toll booths on the roads and this is unnecessary.

Charging takes time: Unlike conventional bikes, which charge in minutes, electric bikes take hours.

Limited options: There aren't many EV models available in terms of looks, styling, or customization.

Shorter range: Electric bikes have a shorter range than conventional bikes. An electric bike will be fine for short trips but not long.

IC ENGINE VEHICLE :

An internal combustion engine vehicle (ICEV) is a vehicle that is powered by a regular internal combustion engine (ICE). ICEV uses fuel that combusts inside a combustion chamber with the help of an oxidizer (typically oxygen from the air). This means that to get power, ICEVs burn fuel. ICEs most commonly use fuels derived from fossil fuels. These include petrol, diesel, jet fuel, and compressed natural gas. In addition to internal combustion engines that use fossil fuels, some ICEs are powered by biofuels (e.g., ethanol and biodiesel) or hydrogen.

Advantages of internal combustion engines

- Size of the engine is less contrasted with external combustion engines
- Capacity to weight proportion is high
- Entirely reasonable for little power necessity applications
- More secure to work

Disadvantages of internal combustion engines

- The assortment of powers that can be utilized is constrained to fine-quality vaporous and fluid fuel
- Fuel utilized is expensive like gas or diesel
- Motor discharges are commonly high contrasted with outer burning motor
- Not reasonable of extensive scale control age

COMPARISON OF INTERNAL COMBUSTION ENGINE VEHICLES TO ELECTRIC VEHICLES

POINTS OF COMPARISON	INTERNAL COMBUSTION ENGINE VEHICLES	ELECTRIC VEHICLES
Source of power	Internal combustion engine vehicles work with different types of fuel, such as diesel or gasoline.	Rechargeable batteries, ultracapacitors are the power source of electric vehicles
Prime Mover	The internal combustion engine is a prime mover.	The electric motor is the prime mover
Refilling time	CEV requires less refilling time (approx. less than 5 min.).	EV has a long charging time, about 0.5 to 8 hours.
Space & weight fuel tank	In ICEV, a fuel tank takes less space and the weight of fuel is very less.	In EV, the batter bank takes large. Also, the batteries are very heavy.

Maintenance & running costs	The maintenance and running costs of internal combustion engine vehicles are high.	Electric vehicles require low running and maintenance costs.
Efficiency	The efficiency of IC engines is about 30%.	The electric motors used in electric vehicles have approximately 80% efficiency.
Noise production	IC engine vehicles produce noise.	Electric vehicles have a noise-free operation.
Time required for maximum torque	IC engine vehicles require to pick up some speed to deliver maximum torque.	Electric vehicles produce maximum torque instantly after starting of motor.
Capital cost	IC engine vehicles have an average initial cost.	The initial cost of electric vehicles is high.

COMPARE THE CARBON FOOTPRINT AND RUNNING COST OF ELECTRIC VEHICLES AND IC ENGINE VEHICLE

CARBON FOOTPRINT

A carbon footprint (or greenhouse gas footprint) is a "certain number of gaseous emissions that are relevant to climate change and associated with human production or consumption activities". In some cases, the carbon footprint is expressed as the carbon dioxide equivalent which is meant to sum up the total greenhouse gas emissions caused by an individual, event, organization, service, place, or product

We compare IC engine vehicles most sale bikes Hero Splendor 100cc and Magnus EX electrical vehicle

Electric vehicle- Magnus ex

- Battery type- Advanced lithium battery
- Battery capacity- 60V and 38.25 Ah
- 1time charge capacity- 2.2 units
- 1 unit charge vehicle move- 50Km
- 1km Vehicles moving consume the electricity- 20W
- 1-unit current charge- Rs .3
- 1km running cost- 6.6 paisa
- 1 unit of electricity produces an amount of co_2- 0.3878Kg
- 1Km vehicle move produce co_2 - 7.7 grams

IC engine- Hero Splendor

- Engine TYPE – Air-cooled, 4-stroke, Single cylinder
- Engine Max Power- 8.02 PS @ 8000 rpm
- Engine max torque- 8.05 Nm @ 6000 rpm
- Fuel Capacity- 9.8 L
- 1 litter petrol vehicle move distance - 60km
- 1 litter petrol rate – Rs 100
- 1km running cost- Rs. 1.66 (or) 166 paisa
- 1 litter emits the co_2- 2.4 kg
- 1km distance move vehicle emits co_2. 40grams

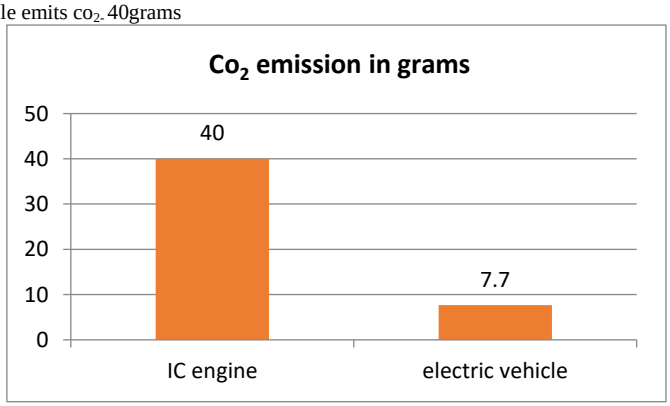


Fig 2- Co_2 emission in 1 km distance (electric vehicle and IC engine)

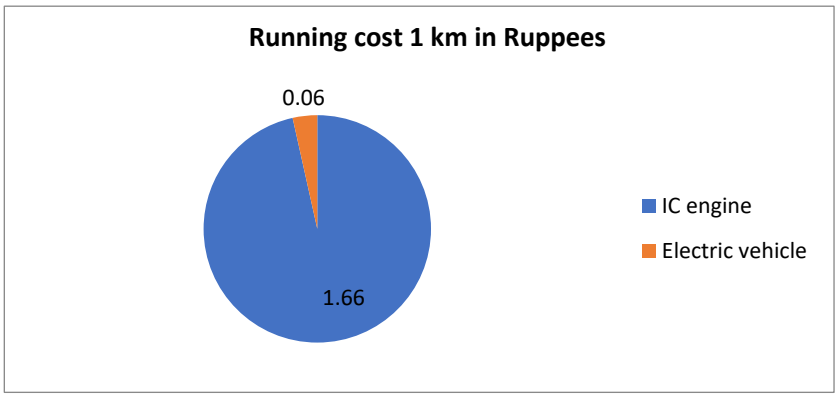


Fig 3- Running cost of 1km distance (electric vehicle and IC engine)

CONCLUSION :

Internal combustion engines run on fossil fuels, which cause many problems for the environment and humans. Electric scooters have many advantages over ICE vehicles. As a result, the automotive industry is turning to electric vehicles. Electric scooters have been in development for many years and are still being researched to improve their performance. This article also highlights the pros and cons of electric vehicles. In addition, the analysis of the carbon footprint of electric vehicles compared to internal combustion engine vehicles is discussed.

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