Impact Factor Value 4.046 **e-ISSN: 2456-3463**
National Conference on **"Emerging Trends In Engineering & Technology"**
Organized by **Manoharbhai PatelInstitute Of Engineering& TechnologyShahapur, Bhandara**
International Journal of Innovations in Engineering and Science, Vol. 4, No.5, 2019
www.ijies.net

Comparative Study of Electric Vehicle and Hybrid Electric Vehicle

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Abstract- The Indian Government has encouraged shifting from internal combustion engine vehicles (ICEVs) to alternatively fueled vehicles such as electric vehicles (EVs) for two primary reasons: reducing oil dependence and reducing greenhouse gas emissions.With the more stringent regulations on emissions and fuel economy, global warming, and constraints on energy resources, the electric and hybrid have attracted more and more attention by automakers, governments, and customers. Research and development efforts have been focused on developing novel concepts, low-cost systems, and reliable hybrid electric powertrain. This paper reviews the state of the art of electric and hybrid vehicles.

Keywords—*Battery; energy,electric vehicles, internal combustion engines, plug-in hybrid vehicles.*

I. INTRODUCTION

Compared to conventional vehicles, hybrid electric vehicles (HEVs) are more fuel efficient due to the optimization of the engine operation and recovery of kinetic energy during braking. With the plug-in option (PHEV), the vehicle can be operated on electric-only modes for a driving rangeofupto30–60km.ThePHEVsarechargedovernight from the electric power grid where energy can be generated from renewable sources such as wind and solar energy and from nuclear energy. HEVs are likely to dominate the advanced propulsion in coming years. Hybrid technologies can be used for almost all kinds of fuels and engines. Therefore, it is not a transition technology. In HEVs and FCVs, there are more electrical components used, such as electric machines, power electronic converters, batteries, ultracapacitors, sensors, and microcontrollers. In addition to these electrification components or subsystems, conventional internal combustion engines (ICE), and mechanical and hydraulic systems may still be present.

Electric vehicles are considered to be 97% cleaner, producing no tailpipe emission that can place particulate matter into the atmosphere by gas-powered vehicles can increase asthma condition as well as irritate respiratory systems while EV does not create any such problems.

II. WHY EVs and HEVs?

Vehicles equipped with conventional internal combustion engines (ICE) have been in existence for over 100 years. With the increase of the world population, the demand for vehicles for personal transportation has increased dramatically in the past decade. This trend of increase will only intensify with the catching up of developing countries, such as China, India, and Mexico. The demand for oil has increased significantly. Another problem associated with the ever-increasing use of personal vehicles is the emissions. The green house, effect, also known as global warming, is a serious issue that we have to face. There have been increased tensions in part of the world due to the energy crisis. Government agencies and organizations have developed more stringent standards for the fuel consumption and emissions. Nevertheless, with the ICE technology being matured over the past 100 years, although it will continue to improve with the aid of automotive electronic technology, it will mainly rely on alternative evolution approaches to significantly improve the fuel economy and reduce emissions. Battery-powered electric vehicles were one of the solutions proposed to tackle the energy crisis and global warming. However, the high initial cost, short driving range, long charging (refueling) time, and reduced passenger and cargo space have proved the limitation of battery-powered EVs and HEVs.

III. HISTORY OF EVs and HEVs

A. History of EV

The EV was invented in 1834. During the last decade of the 19th century, a number of companies produced EVs in America, Britain, and France. In London, there were Electric Cab Company's taxis. However, due to the limitations associated with the batteries and the rapid advancement in ICE vehicles, EVs have almost vanished from the scene since 1930. Nevertheless, in the early 1970s, some countries, compelled by the energy crisis, started the rekindling of interests in EVs. In 1976, the U.S. launched the Electric and Hybrid Vehicle Research, Development and Demonstration Act, Public Law 94-413. In the beginning of the 21st century, California had a mandate on the use of zero emission vehicles. Today, EVs are mainly used for small vehicles and short distance applications due to the limitation of batteries.

B.History of HEV

In 1898, the German Dr. Ferdinand Porsche built his first car, the Lohner Electric Chaise. It was the world's first Front-wheel-drive car. Porsche's second car was a hybrid, using an ICE to spin a generator that provided power to electric motors located in the wheel hubs. On battery alone, the car could travel nearly 40 miles. By 1900, American car companies had made 1681 steam, 1575 electric and 936 gasoline cars. In a poll conducted at the first National Automobile Show in New York City, patrons favored electric as their first choice, followed closely by steam. In the first few years of the 20th century, thousands of electric and hybrid cars were produced. This car, made in 1903 by the Krieger Company, used a gasoline engine to supplement a battery pack.

IV. ENGINEERING PHILOSOPHY OF EVs AND HEVs

The overall EV engineering philosophy essentially is the integration of automobile engineering and electrical engineering. Thus, system integration and optimization are prime considerations to achieve good EV performance at affordable cost. Since the characteristics of electric propulsion are fundamentally different from those of engine propulsion, a novel design approach is essential for EV engineering. Moreover, advanced energy sources and intelligent energy management are key factors to enable EVs competing with ICEVs. Of course, the overall cost effectiveness is the fundamental factor for the marketability of EVs. The design approach of modern EVs should include state-of-the-art technologies from automobile engineering, electrical and electronic engineering, and chemical engineering. It should adopt unique designs that are particularly suitable for EVs and should develop special manufacturing technology that is particularly suitable for EVs. Every effort should be made to optimize the energy utilization of EVs.

V. Comparison between EV and HEV

SR NO.	EVs	HEVs
1.	Electric motor drives.	Electric motor drives and internal combustion engines.
2.	Zero emission.	Very low emission.
3.	High energy efficiency.	Higher fuel economy as compared with ICE vehicles.
4.	Independence on crude oils.	Dependence on crude oil (for non-plug in hybrid).

5.	Relatively short range.	Long driving range.
6.	High initial cost.	Higher cost as compared with ICE vehicles.
7.	Commercially available.	Commercially available.
8.	Electric grid charging facilities.	Gasoline stations and Electric grid charging facilities (for plug in hybrid).

VI. CONCLUSION AND FUTURE SCOPE

This paper has presented an overview of the state of the art of EVs and HEVs. With the ever more stringent constraints on energy resources and environmental concerns, HEVs will attract more interest from the automotive industry and the consumer. Although the market share is still insignificant today, it can be predicted that HEVs will gradually gain popularity in the market due to the superior fuel economy and vehicle performance. Modeling and simulation will play important roles in the success of HEV design and development. Control is the prime key technology in HEVs; hence the control theory of HEVs should be further advanced.The combination of rising fuel prices, depletion of fossil fuels and increasing carbon dioxide pollution presents challenges to economies across the globe. India is no exception. India, the world's fifth largest auto market is readying for a transformation moving completely towards electric vehicles by 2030. This is part of the government's vision to help a renewable-energy revolution in the country. So after 2030 in whole globe only electric vehicles running on roads.

REFERENCES

[1] *C. C. Chan, The state of the art of electric and hybrid vehicles,[Proc. IEEE, vol. 90, no. 2, pp. 247–275, Feb. 2002.*

[2] *K. Yamada, H. Hanada, and S. Sasaki, The motor control technologies for GS450h hybrid system, [in Proc. EVS-22, Yokohama, Japan, Oct. 2006, pp. 827–835.*

[3] *A. F. Burke, Cost-effective combinations of ultra-capacitors and batteries for vehicle applications, [in Proc. 2nd Int. Advanced Battery Conf., Las Vegas, NV, Feb. 4–7, 2002.*

[4] *Proc. 21st Worldwide Battery, Hybrid and Fuel Cell Electric Vehicle Sump. Exhibition, EVS-21, Monaco, Apr. 2–6, 2005.*

[5] *Proc. 22nd Worldwide Battery, Hybrid and Fuel Cell Electric Vehicle Sump. Exhibition, EVS-22, Yokohama, Japan, Oct. 24–28, 2006.*

[6] *Proc. IEEE Vehicle Power and Propulsion Conf. 2005 (VPPC 2005), Chicago, IL, Sep. 7–9, 2005.*

[7] *FU Aia (Ms.), "The Role of Electric Two-Wheelers in Sustainable Urban Transport in China". Market Analyst, Beijing, China .*