International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1364-1368 www.ijaem.net ISSN: 2395-5252

Creating and Testing Of Electric Vehicle

SK Yadav., Kajal tyagi
(Asst. Professor).
"Department of electronic and communication engineering "
Babu Banarsi Dass Institute of Technology,ghaziabad
Uttar Pradesh Technical university, Lucknow
"September 2022"

Date of Submission: 20-09-2022 Date of Acceptance: 30-09-2022

ABSTRACT
The present times are experiencing an increase in power consumption. This ever-increasing demand highlights the importance of introducing an efficient and accessible source of energy which is capable of fulfilling these demands effectively. To solve this issue and produce sufficient amounts of energy, ample amounts of resources are being utilized. However, this can also result in the production of harmful byproducts which may interfere with the ecological and environmental balance. Electric transportation is one such solution of this problem. The development and introduction of electric vehicles could contribute to solving the issues of environmental degradation. Electric vehicles do not directly depend on fossil fuels or any other such conventional sources for its working. Thus, they can be considered as an ideal solution for counteracting on the problems of energy crises and the future of transportation.
This paper suggests developing a prototype which can help in increasing the efficiency of electric vehicles. Today's age can be considered to be belonging to EV's due to their technological developments, and an increase in focus on renewable energy. These have added benefits of less cost in comparison to conventional gas vehicles. Electric vehicle is a better option for the environment as they are non-dependent on fossil fuels like gasoline. Furthermore, it is anticipated that the global percentage of electric vehicles will rise from 2% in 2016 to 22% in 2030.With help of this new concept EV's could change the Electronic Transportation Market.

I. INTRODUCTION

The current global trend shows a growing shift toward the usage of resources other than conventional ones. People have shifted to the electric or E-way of doing things as a result of the price and availability of alternative energy sources. As of March 31, 2015, there were approximately 210023289 motor vehicles registered in India alone. Additionally, vehicles have switched from using gasoline to more environmentally friendly battery-powered alternatives. For the improvement of efficiency, design, and other similar variables impacting a vehicle's total performance, it necessitates a large deal of work and regular upgrading.

Benz invented the first motor car in 1879, and functional electric vehicles have been available since the 1870s. However, until recently, EVs did not experience significant growth in other related fields of technology. As a result of cars investigating EV possibilities, EV resources become more accessible or less expensive during the course of an EV's lifespan. There are still several obstacles in the way of its progress, nevertheless, despite all the advances.To boost on board efficiency of wheels are powered by 59%–62% of the electrical energy from the grid. is the most crucial issue that designers must address. This nevertheless represents an improvement over conventional gasoline automobiles, which only effectively utilise 17%–21% of the energy stored in gasoline. Utilizing energy losses that go unreported and transforming it into a useable form of energy is a tremendous undertaking in and of itself. Therefore, following discussions will introduce and clarify the concept while using logical justifications to serve as an explanatory purpose.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1364-1368 www.ijaem.net ISSN: 2395-5252

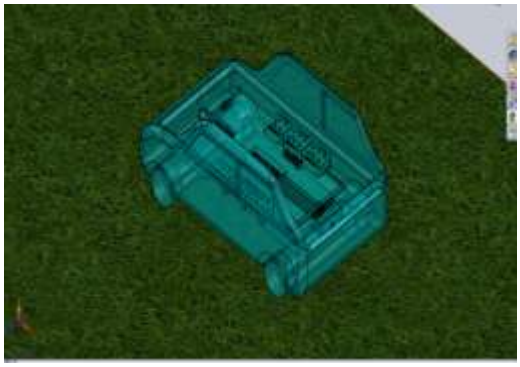

Fig. 1. Simple Isometric view of car showing some major components of e-car.

This section makes a suggestion for a solution to the EV's market-available restrictions that were previously highlighted. By making minor adjustments to the electrical layout of cars, such as swapping the original battery for a pair with a same total power, the notion aims to increase their efficiency. The addition of an electric generator to the vehicle circuitry is one of the other changes.
These additions to the vehicle alter how an electric vehicle generally operates as stated:

When two batteries are first fully charged, one battery should be used as the primary battery and the other as the backup. In this case, the primary battery is in charge of the car operating as the user intended. These could involve moving the car forward, using lights, and using other power-hungry components up until it is discharged.

Also a switch-over module is appended to the electric circuit of the electrical vehicle which will be responsible for the switching and interchanging functioning of the batteries. It could be explained further if need be as of now it is discussed as per the requirements.

As soon as the primary battery is discharged, the switch –over circuit will come in to action as it connects the secondary or the charged battery, which will be used in place of primary battery and fulfill vehicle's energy requirements, earlier taken care by primary battery, while the drained battery is connected to a generator through switch over circuit. Generator is powered by the rotating axils of the vehicle. The torque produced to rotate the wheels is also used to power the generator, recalling working principle of electric motor help understand the working of the components and vital roles they play in overall sense. The electrical generator produces power which in turn will be used to charge the battery. This recharging module is connected to the terminals of battery to be charged. This power is supposed to charge the discharged battery to some extent. Since neither of the batteries are connected to each other. so while charging discharged battery will not act as a load for charged battery, this cycle of charging of discharged battery and driving car by the counter battery can be repeated a number of times till both batteries die out of power. This would increase the overall running time of the car after single full charge as compared with a car with a single battery with full charge. This not only benefits the user in numerous ways but also contributes in restoring the planet.

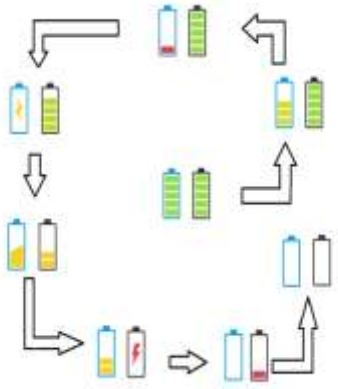

Fig.2. Charging process in batteries

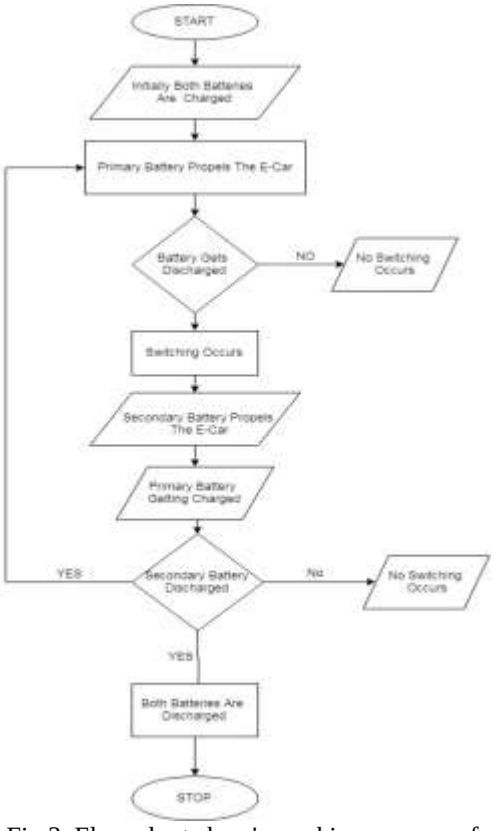

Fig.3. Flow chart show's working process of electric vehicle

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1364-1368 www.ijaem.net ISSN: 2395-5252

EVs have zero tailpipe emissions even though They might be released by the electrical generation facility.so this could not only improve the overall efficiency of a electric car but it is also a great step towards betterment of environmentand improving technology using green energy.

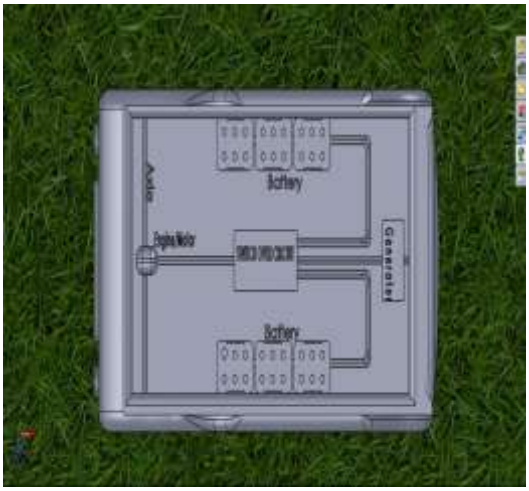

Fig. 4. Explanation of idea through an illustrative diagram

For example, the car's battery may be replaced by a pair of batteries or a number of smaller batteries that could be installed into the car and be able to operate all duties smoothly, saving a lot of energy and lowering the cost of operating electronic automobiles now on the market. These smaller batteries will now be utilised and discharged one at a time. In order to keep the vehicle operating longer than with a single battery, the drained battery will be charged by a generator during the power cycle of the other battery. Before being put into practise, thisconcept must passnumerous physical and simulation testing.


Fig. 5. Battery compartment of Present electric car. Showing smaller batteries connected together to make single battery

Hardware

- Generator:

Generator powered by rotating axle of vehicle that produces a meaningful amount of energy to be able to charge a battery.

- Switch Over Circuit:

Switch over circuit was touched briefly in above explanations. A switch over circuit will comprise of a decision making unit, main work of decision making unit is to decide which battery is to be charged by connecting it to the generator and which battery is to be used for fulfillment of vehicles requirements.

- Motor Controller:

Themotorcontrolleradministerscompleteoperationa ndthedistributionofitspowertovehicleatanygivenpoi ntoftime.Itmonitorsandregulatesperformancerelated indicationsasthevehicle'soperator,motor,battery,and accelerator.Itcomprisesofamicroprocessorwhichlim itsorredirectsthecurrent.Itisusedtoimprovethemecha nicalperformanceofthecarandalsosuittheoperator'sd rivingstyle.

- ElectricEngine:

An electric engine or motor just has one working part, unlike a gas engine, making it a dependable energy source.They have greater resistance to mechanical deterioration.

- Batteries:

1. Lithium-Ion Batteries:Because of their high energy per mass, these batteries are currently found in portable consumer electronics. Additionally, they possess qualities such a strong power-to-weight ratio, good high-temperature performance, great energy economy, and minimal self-discharge. Lithium-ion battery parts can be recycled. Lithium-ion batteries are used by the majority of electric vehicles.
2. Nickel-Metal Hydride Batteries:Batteries made of nickel-metal hydride have longer life cycles, are secure, and can withstand abuse. These batteries are utilised in electric vehicles. These batteries' high price and heat production at high temperatures are their main drawbacks.
3. Lead- Acid Batteries:They are safe and dependable to use because they are made for great power and low cost. Although sophisticated high-power lead-acid batteries are being created, they are only used as accessory loads in commercially accessible electric vehicles.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 4, Issue 9 Sep. 2022, pp: 1364-1368 www.ijaem.net ISSN: 2395-5252

4. Ultra Capacitors:Between an electrode and an electrolyte, polarised liquid serves as a storage medium for energy. As the surface area of a liquid rises, so does its ability to store energy. These can provide vehicles more power when accelerating and negotiating hills.

Problem faced

Compared to gasoline-powered automobiles, EVs have some disadvantages:

- Vehicle Range:

Even with improving drive range of EV's, Conventional vehicles have longer driving range than EV's. EVs can cover around 100 miles or on a charge subject to the model.

- Recharge period:

It can take the battery pack between three and twelve hours to fully recharge. It is quite complex to reduce even with present technologies.

- Availability of Generators:

Designing a generator that is powered by axle torque of vehicle and which could produce sufficient power to recharge some amount of drained battery of a car meeting its charging specifications.

- Load:

Loading and total weight will also affect the charging patterns of battery.

Future aspects

- Introduction of Regenerative Braking**.**
- Development of Physical Model**.**
- Implementation of Idea.
- Power Amplification of Generator.

II. RESULT AND CONCLUSION

- Benefits for performance: Electric motors offer smooth, quiet operation and more powerful acceleration. In comparison to internal combustion engines, it requires less maintenance (ICEs).With implementation of presented idea the overall efficiency is greatly improved.

- Energy Security:

Approximately 59%–62% of the electrical energy taken from the grid by EVs is converted to additional enhanced power at the wheels. Transportation accounts fair ratio of total petroleum consumption of a country, using more energy efficient vehicles direct impact on improving economy. All of this contributes inenergy of country.

- Fuel Efficiency:

Compared to gasoline vehicles, EVs have superior fuel efficiency and reduced fuel expenses. Due to their extremely effective electric-drive components, EVs can significantly save fuel expenditures. Due to their whole or partial reliance on electricity, EVs are evaluated differently than other vehicles. The metric system to be used is miles per gallon of gasoline equivalent (mpge) and kilowatt-hours (kWh). EVs can continue to outperform their conventional competitors in terms of fuel costs.

- Costs:

Although electric car fuel expenses are often modest, startup costs can be very expensive. However, as the market develops and consumption rises, prices will probably go down. Additionally, the lifetime ownership cost is considerably lower.

- **Environmentally Friendly:**

Owning an electric vehicle is always better for environment than conventional vehicles. With advancement in technologies it is advisable to use electric vehicles. Moreover no pigtail emission is noticed during its lifecycle and after lifecycle of car most of the components are recycled including batteries.

REFERENCES

[1] Guarnieri, M. (2012). "Looking back to electric cars". Proc. HISTELCON 2012 - 3rd Region-8 IEEE HISTory of Electro - Technology CONference: The Origins of Electrotechnologies: #6487583. doi:10.1109/HISTELCON.2012.6487583.

[2] Matthe, Roland; Eberle, Ulrich (1 January 2014). "The Voltec System: Energy Storage and Electric Propulsion". The Voltec System – Energy Storage and Electric Propulsion. pp. 151–176. ISBN 9780444595133.

[3] Omar, N.; Daowd, M.; Bossche, P.; Hegazy, O.; Smekens, J.; Coosemans, T.; Mierlo, J. Rechargeable Energy Storage Systems for Plug-in Hybrid Electric Vehicles—Assessment of Electrical Characteristics. Energies 2012, 5, 2952–2988.

[4] Messagie, M.; Boureima, F.-S.; Coosemans, T.; Macharis, C.; Van Mierlo, V. A Range-Based Vehicle Life Cycle Assessment Incorporating Variability in the Environmental Assessment of Different Vehicle Technologies and Fuels. Energies 2014, 7, 1467–1482.

[5] K.W.E. Cheng, "Recent development on electric vehicles", Power Electronics

Systems and Applications 2009. PESA 2009. 3rd International Conference on, pp. 1-5, 2009. [6]Hooftman, N.; Oliveira, L.; Messagie, M.; Coosemans, T.; Van Mierlo, J. Environmental Analysis of Petrol, Diesel and Electric Passenger Cars in a Belgian Urban Setting. Energies 2016, 9, 84.

[7] Berckmans, G.; Messagie, M.; Smekens, J.; Omar, N.; Vanhaverbeke, L.; Van Mierlo, J. Cost Projection of State of the Art Lithium-Ion Batteries for Electric Vehicles Up to 2030. Energies 2017, 10, 1314.

[8] J. Malan, M.J. Kamper, "Performance of hybrid electric vehicle using reluctance synchronous machine technology", Industry Applications Conference 2000. Conference Record of the 2000 IEEE, vol. 3, pp. 1881-1887 vol.3, 2000.

[9] Yee-Pien Yang, Xian-Yee Xing, "Design of electric differential system for an electric vehicle with dual wheel motors", Decision and Control 2008. CDC 2008. 47th IEEE Conference on, pp. 4414-4419, 2008.

[10] Matthew Li, Jun Lu, Zhongwei Chen, Khalil Amine, "30 Years of Lithium-Ion Batteries", Advanced Materials, pp. 1800561, 2018.

[11] M. Yaich, M. R. Hachicha and M. Ghariani, "Modeling and simulation of electric and hybrid vehicles for recreational vehicle," 2015 16th International Conference on Sciences and Techniques of Automatic Control and Computer Engineering (STA), Monastir, 2015, pp. 181-187. doi: 10.1109/STA.2015.7505098.

[12] M. S. A. Chowdhury, K. A. A. Mamun and A. M. Rahman, "Modelling and simulation of power system of battery, solar and fuel cell powered Hybrid Electric vehicle," 2016 3rd International Conference on Electrical Engineering and Information Communication Technology (ICEEICT), Dhaka, 2016, pp. 1-6. doi: 10.1109/CEEICT.2016.7873126.