e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:01/January-2022 Impact Factor- 6.752 www.irjmets.com

HYBRID ELECTRIC VEHICLES- A REVIEW

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ABSTRACT

Unexpectedly, the concept of a hybrid electric vehicle is virtually as old as the automobile the situation. The primary resolution, however, was not so much to lower the fuel feasting but slightly to assist the ICE to provide an adequate level of performance. Definitely, in the early days, ICE engineering was less eccentric than electric motor engineering. The first hybrid vehicles transported were shown at the Paris Salon of 1899. These were built by the Pieper launched of Liège, Belgium and by the Vendovelli and Priestly Electric Carriage Company, France.

Keywords: Electric Motors, Batteries, Regenerative Braking, Hybrid Engine.

I. INTRODUCTION

Traditional vehicles with internal combustion engines (ICE) provide good presentation and long operating range by misusing the high energy-density advantages of petroleum fuels. Motionless, conventional ICE vehicles tolerate the softness of poor fuel economy and environmental pollution. The main enlightenments for their poor fuel economy are engine fuel efficiency entrances are mismatched with the real operation supplies dissipation of vehicle kinetic energy finished braking, especially while operating in urban areas, and low efficiency of hydraulic program in current automobiles in stop-and-go driving patterns . Battery-powered electric vehicles (EV), on the other hand, have some advantages over conventional ICE vehicles, such as high energy effectiveness and zero environmental pollution. Though, the performance, especially the operation range per battery charge, is far less inexpensive than ICE vehicles, due to the lower energy satisfied of the batteries vs. the energy satisfied of gasoline. Hybrid electric vehicles which use two power sources — a primary power source and a secondary power font — have the advantages of both ICE vehicles and EV and overcome their weaknesses. In this chapter, the basic perception and operation principles of the HEV power trains are deliberated.

II. CONCEPT OF ELECTRIC DRIVE TRAIN

Basically, any vehicle power train is required to develop satisfactory power to meet the demands of vehicle performance, carry necessary energy onboard to support vehicle driving in the given assortment, demonstrate high efficiency, and emit rare environmental pollutants. Broadly, a vehicle may have more than one energy source and energy evangelist (power source), such as a gasoline (or diesel) heat engine system, hydrogen–fuel cell–electric motor system, chemical battery–electric motor arrangement, etc. A vehicle that has two or more energy causes and energy converters is called a hybrid vehicle. A hybrid vehicle through an electrical power train (energy source energy converters) is called an HEV.

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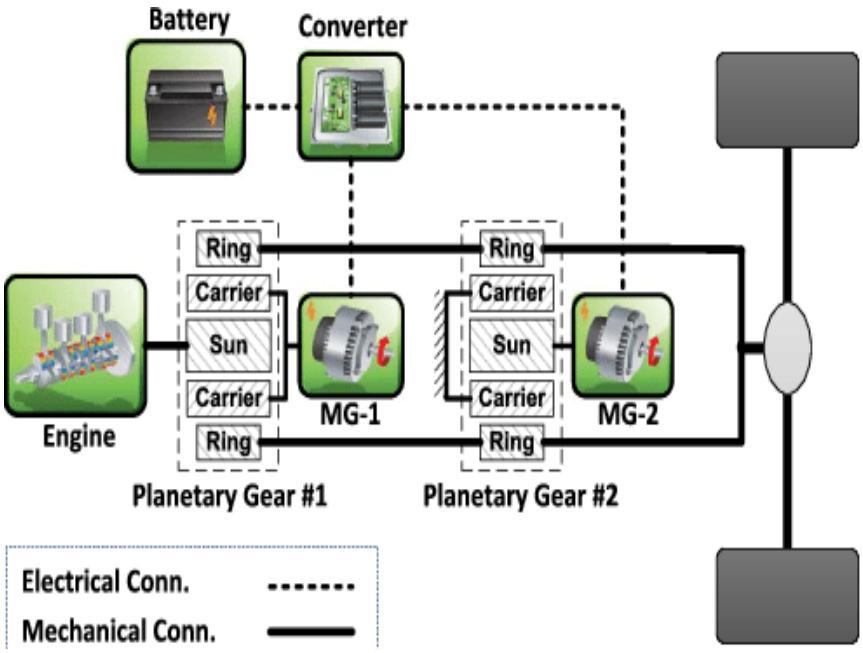

III. ARCHITECTURES OF HYBRID ELECTRIC DRIVE TRAINS

The architecture of a hybrid vehicle is slackly defined as the connection between the components that define the energy flow directions and control ports. Traditionally, HEV were classified into two basic types: series and parallel. It is motivating to note that, in 2000, some newly introduced HEVs could not be confidential into these kinds. Therefore, HEVs are now confidential into four kinds: series hybrid, parallel hybrid, series–parallel hybrid, and complex hybri

A. Series Hybrid Electric drive Train

A series hybrid drive train is a drive train where two power sources feedstuff a single powerplant (electric motor) that propels the vehicle. The most frequently found series hybrid drive train is the series hybrid electric drive train . The unidirectional energy cause is a fuel tank and the unidirectional energy converter is an engine attached to an electric generator. The output of the electric generator is allied to an electric power bus through an electronic converter (rectifier).

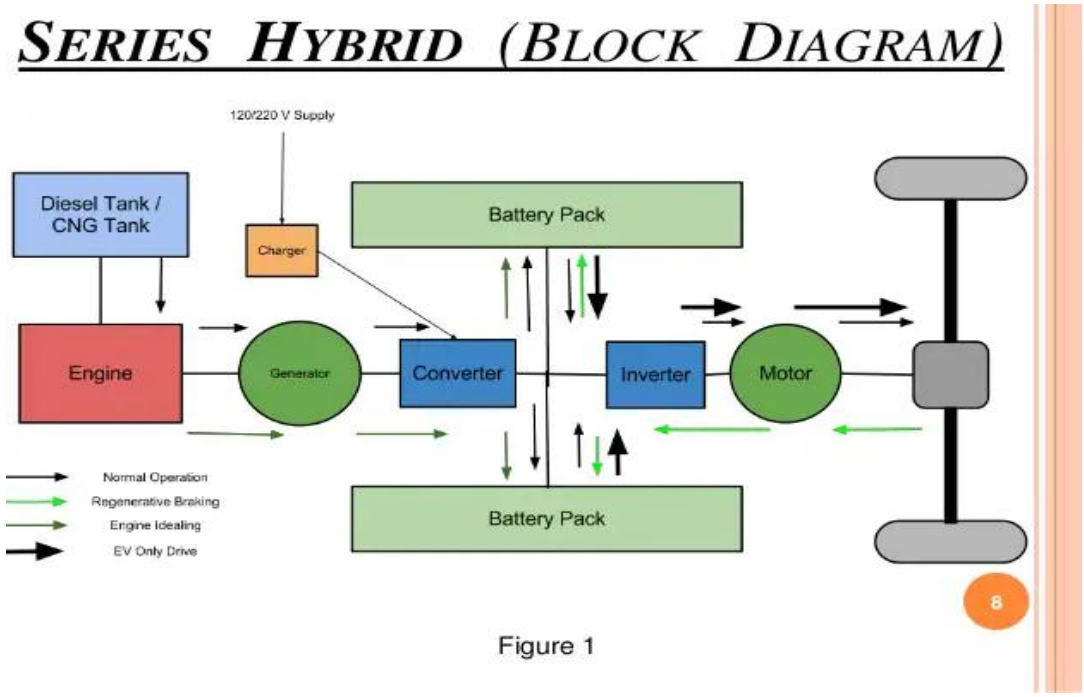

Figure 1

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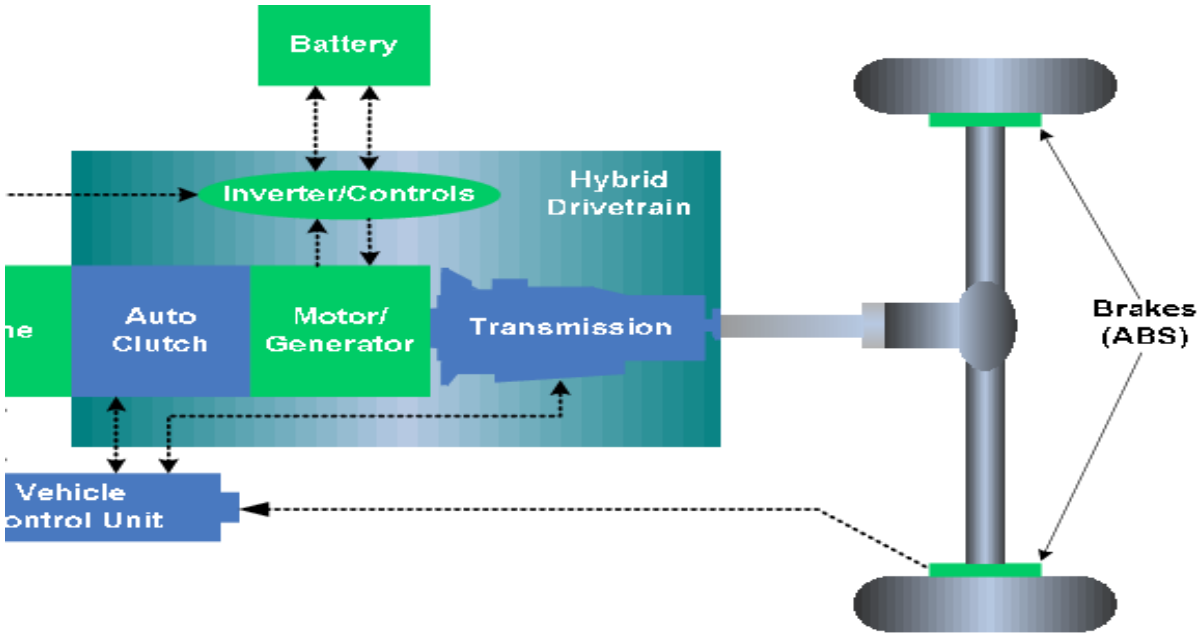
B. Parallel Hybrid Electric Drive Trains

A parallel hybrid drive train is a drive train in which the engine materials its power mechanically to the wheels like in a conventional ICE-powered vehicle. It is abetted by an electric motor that is mechanically coupled to the transmission. The powers of the engine and electric motor are coupled organized by mechanical coupling. The mechanical combination of the engine and electric motor power greeneries room for several different configurations.



 # Torque-Coupling Parallel Hybrid Electric Drive Trains

The mechanical coupling might be a torque or speed coupling. The torque coupling adds the torques of the engine and the electric motor collected or splits the engine torque into two parts: propelling and battery charging, conceptually expressions a mechanical torque coupling, which has two inputs. One is from the engine and other is from the electric motor.

 # SERIES-PARALLEL HYBRID ELECTRIC VEHICLE

This drive train is a amalgamation of the two drive train types, allowing for the vehicle to activate as all-electric (as a series hybrid), as an all combustion vehicle, or as a amalgamation of the two (as a parallel hybrid). This is the most composite and least competent power train for most applications. Combined hybrid systems have topographies of both series and parallel hybrids. There is a two-fold connection between the engine and the drive axle: mechanical and electrical. This split power path consents interconnecting mechanical and electrical power, at some cost in complication. Power-split devices are unified in the power train. The power to the wheels canister be either mechanical or electrical or both. This is also in the case in parallel hybrids. But the main opinion behind the combined system is the decoupling of the power supplied by the engine from the power demanded by the driver. In a conventional vehicle, a larger engine is used to afford acceleration from standstill than one needed for steady speed cruising. This is because a combustion engine's torque is trifling at lower RPMs, as the engine is its own air pump. On the other hand, an electric motor revelations maximum torque at stall and is well suited to complement the engine's torque deficiency at low RPMs. In a combined hybrid at lower speeds, this system activates as a series HEV, while at high speeds, where the series powertrain is not as much of efficient, the engine takes completed. This system is more posh than a pure parallel system as it desires an extra generator, a mechanical split power system and more computing power to regulator the dual system.

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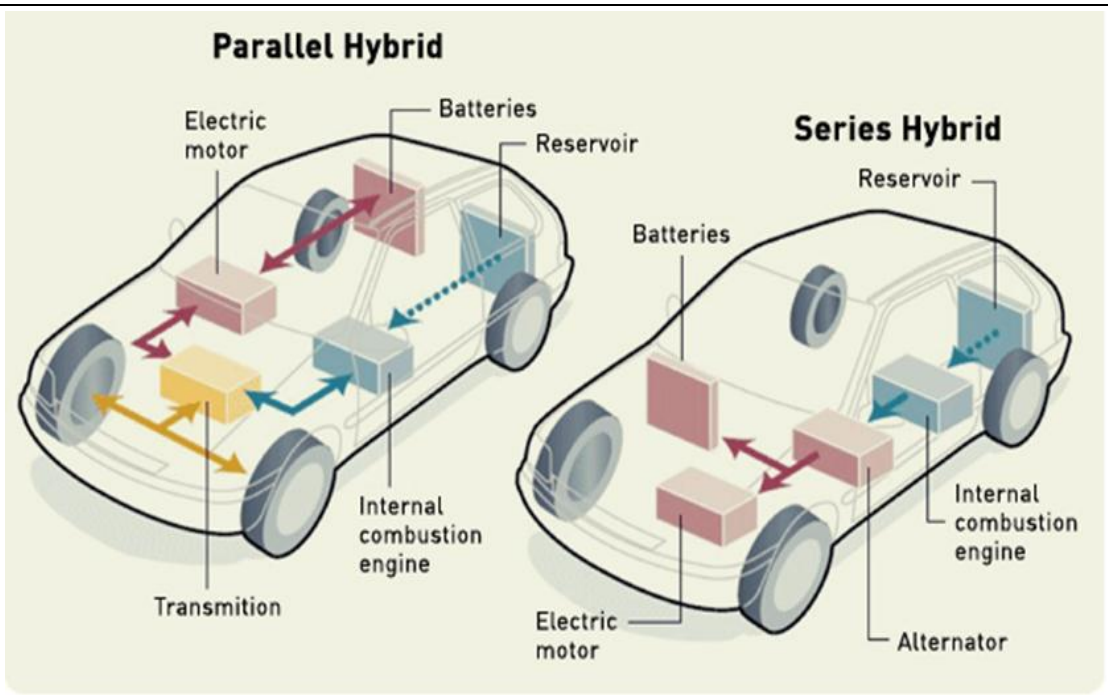

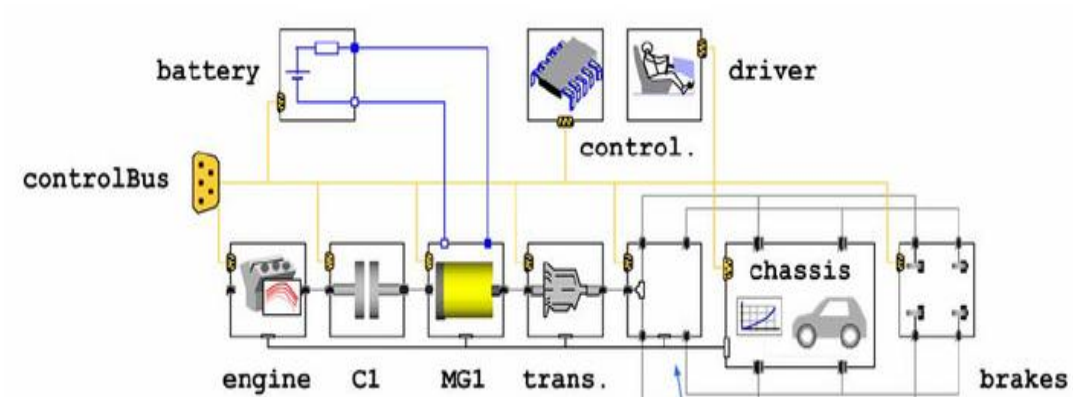

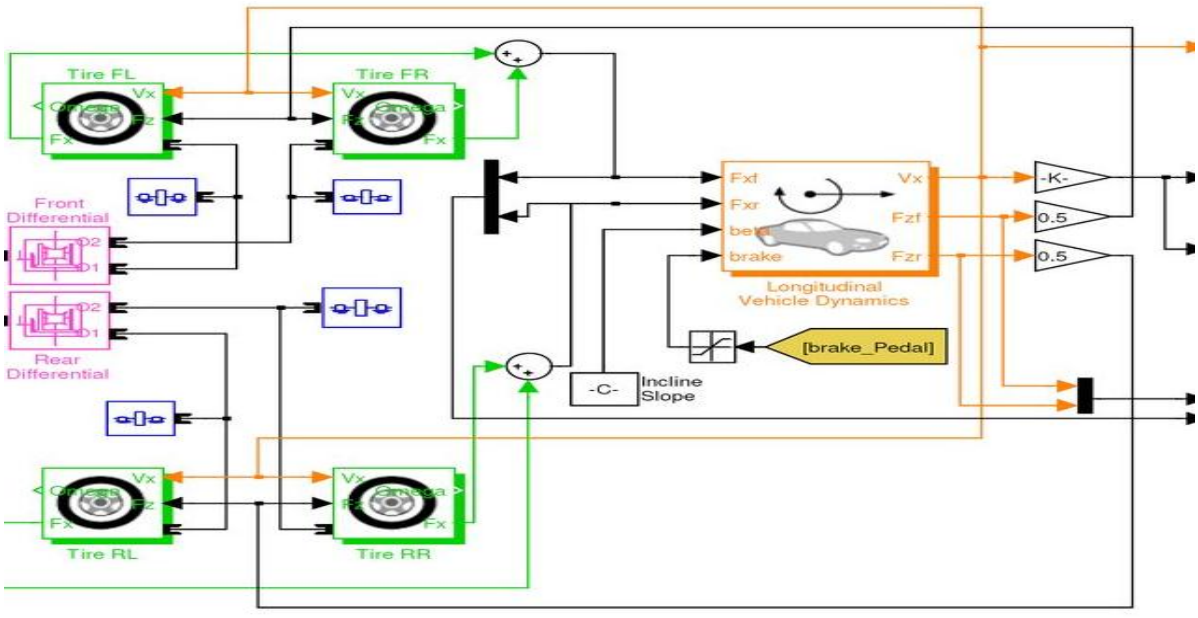

Simulation of series parallel hybrid Electric Vehicle

IV. CONCLUSION

Hybrid-electric vehicles (HEVs) syndicate the reimbursements of both IC engines and electric motors and can be configured to attain different objectives, such as improved fuel economy, increased power, or additional auxiliary power for electronic devices and power tackles. The transmission of power exploitation freewheels and chain wheels are very cheap and reliable. One drawback is that driving on electric power is not a good option for a long detachment travel. Though this collective power train system can become much convenient in more stop and go traffic situations . The budgets of HEVs are a little more than the conventional cars but they more resourceful and the consume emissions are less.

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