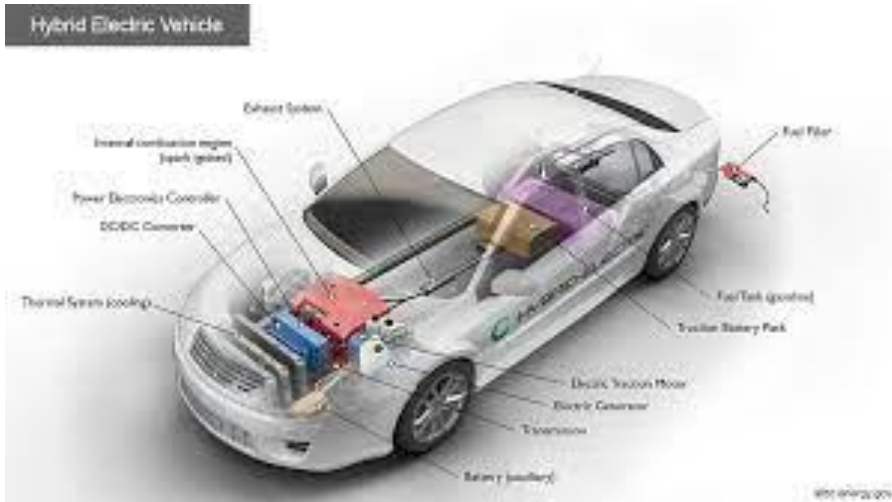


BASIC CONCEPT OF HYBRID TRACTION

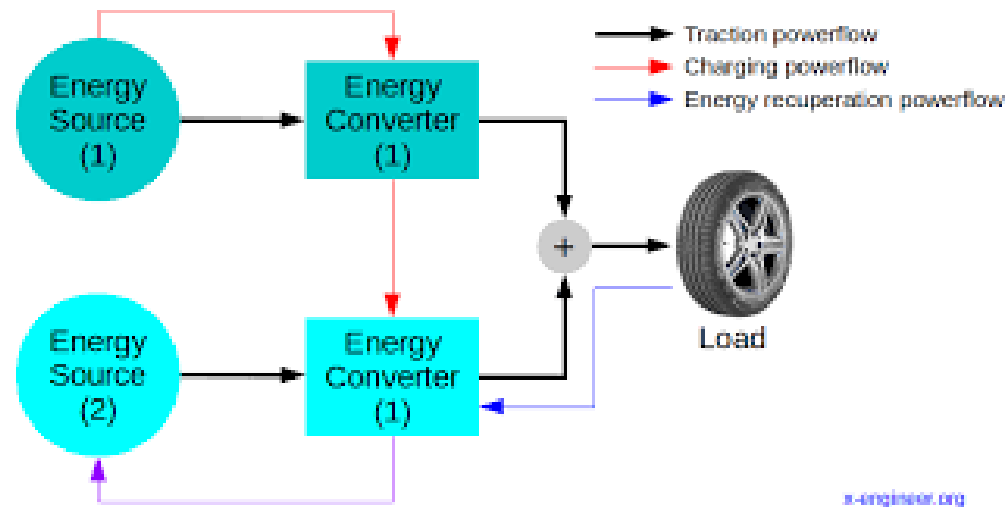
TOPIC OUTLINE



- What are the four main parts of a traction power system?
- What is electric traction explain in brief?
- What are the different types of traction system?
- What is used in electric traction?

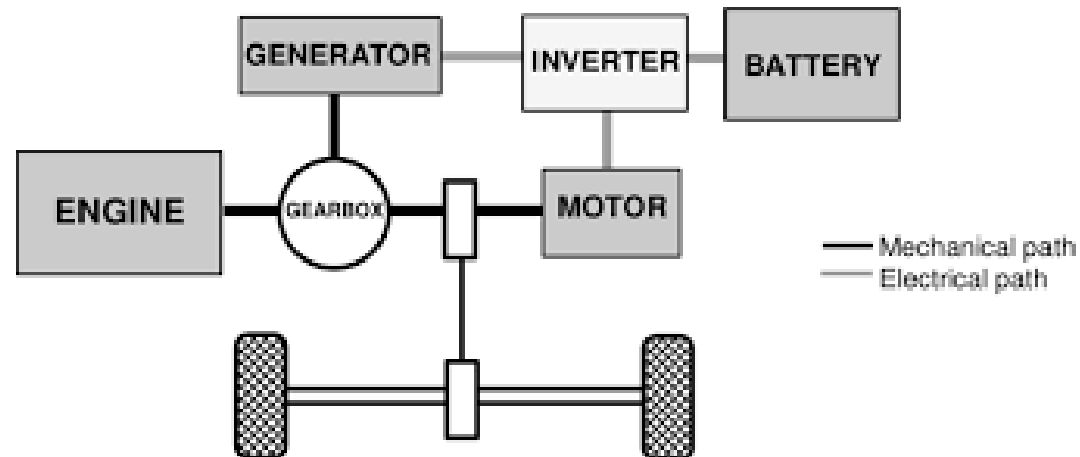
Hybrid Traction :

- The hybrid system **mechanically assists the engine power in accelerating power in the higher speed range with the traction motor power, which is applied to an express-type train.** Therefore, a diesel railcar's traction technology is adapted to its basic system configuration.



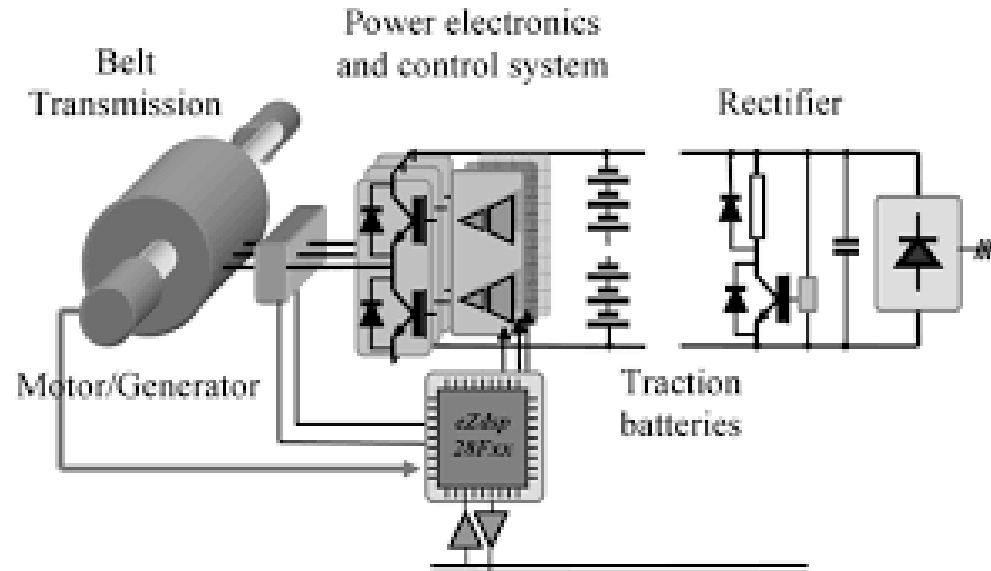
Introduction :

- some of railway operation sectors are developing the hybrid-powered railway vehicles. In this paper, the basic design concepts and the variations of hybrid traction systems are presented, as well as the fuel cell hybrid traction technologies. Some of the examples of hybrid rail cars, both in commercial service and in the development or testing phase, are explained. Energy storage devices and their application technologies are discussed. This paper deals with the technical features and the trends of energy storage technologies applied to the hybrid rail cars for non electrified railway lines.



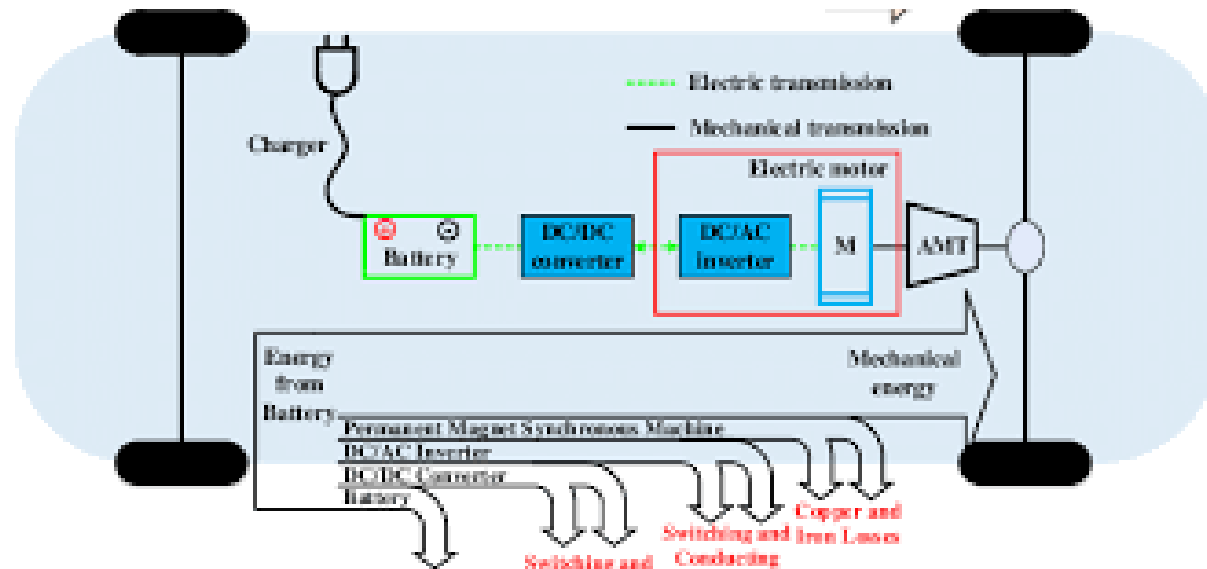
Evolution of hybrid traction systems

- The energy sources for railcar traction are mainly divided into the electricity and light oil. The sources of motive force are classified into the electric motors and the internal combustion engines. The electricity is usually supplied to the traction motors through overhead catenaries or third rails, while light oil from onboard tanks is supplied to the engines



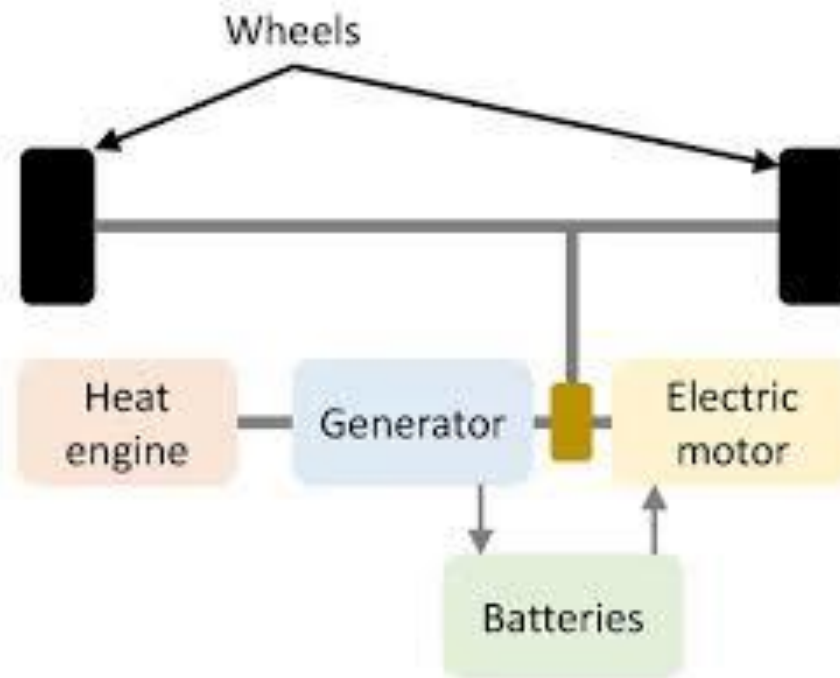
Batteries for hybrid traction systems

- rated power and the maximum energy of each hybrid rail car, for the nonelectrified line. The plots of the battery power versus the battery energy, both of which are nominalized by the car weight. Two dotted lines for 6 and 3 min, obtained by dividing the figures of kWh/t by kW/t, indicate the relative charging and discharging time of the battery on board.



Future perspectives of the hybrid traction system by the evolution of the energy storage devices.

- The progress in the performance of the energy storage devices will provide more options to the systems as to how much and where the electricity is fed to the railway vehicles. According to a study, the energy density of batteries would double by 2030.



Conclusion :

- Evolution of new traction systems has started with the efficient energy use by hybrid systems and system changes of rail cars on nonelectrified railway lines. The goal of the evolution is not to depend on the fossil fuel. The railway system has been contributing to the society as an 'environmentally friendly' transportation system by efficient electric rail car configurations. It must proceed further with the reduction of environmental impact by the hybrid system, for instance. To reduce environmental impact, whole railway system, including the ground power feeding facilities and railway vehicles, must be optimized along with the progress of performance of the energy storage devices.

THANK YOU