

## BENEFITS AND SHORTCOMINGS OF BATTERY OPERATED EMV

(a) Benefits of Battery operated electric motor vehicles are:

(i) Electric vehicles run on electricity generated from batteries do not emit air pollutants. Therefore, these vehicles are termed 'zero emission vehicles'.

(ii) Within city, since most people drive vehicles less than 40 miles per day, electric cars are certainly practical for moving within a city.

(iii) Fossil fuel use in internal combustion engines give rise to various environmental problems and these problems may be solved by using battery operated electric vehicles.

(iv) Electric cars are more efficient than petrol / diesel driven vehicles in terms of performance per unit amount of money and yield better air quality.

(v) Decreased fuel costs for battery operated electric vehicles make them more cost-effective in the long run.

(vi) An electric car of today would only get better over time; as in near future the performance, cost and efficiency of batteries available would be much better.

(vii) In most of the case, driving an electric car is more smother and people feel very similar or better to driving a gasoline car.

(viii) Without the internal combustion engine, electric cars have the potential to be quieter and noise pollution is much less.

(ix) As the number of electric vehicle increases, number of recharging station will be more and drivers will be able to recharge their cars by plugging them in overnight to a recharging outlet or at home.

(x) Lot of research is going on for improving the battery size, battery life and recharging time for batteries; and in near future rapid developments could be seen in this respect.

(b) There are few shortcomings of electrically driven motor vehicles, which are mostly of battery related:

(i) While electric cars themselves are clean, but generating electricity to charge vehicle batteries produces air pollution and solid waste.

(ii) Potential health or safety risks associated with widespread use of electric vehicles have not yet been fully evaluated.

(iii) Many vehicle batteries contain toxic elements or produce toxic emissions which could make battery production, transport, use, and disposal a significant solid waste risks. We should try to use environment-friendly batteries.

(iv) People must consider how safely to dispose of or recycle these batteries. As current batteries are large and heavy, battery occupies large space leaving less room for cargo and passengers.

D. Options of various alternative fuels for motor vehicles:

We discuss below various other fuels that can be used as alternative to fossil fuel for motor vehicles; some of the fuels discussed are renewable:

(a) Bio-diesel: Motor vehicles can be very efficiently run by bio-diesel. Internal combustion engines are common in motor vehicles and are traditionally fuelled by diesel derived from fossil fuels. Thankfully

diesel is a compound which can be replaced with bio-diesel which is an organically based product and is renewable. It is relatively easily produced from plant and animal oils, fats and greases. Environmentally, bio-diesel run vehicles also gives benefits in reduction of pollution.

(b) Liquefied Petroleum Gas (LPG): LPG is an alternative to petrol (gasoline), it offers lower local pollution levels than normal fuels. This fuel is compatible with petrol and many vehicles can run on either (dual-fuel vehicles); so the limited distribution of LPG is not a problem. Its main claims to fame are its reduced local pollution and it is also cheaper to run. Unfortunately, it is not renewable as it is petroleum based product and does not qualify for tackling climate change.

(c) Liquefied Natural Gas (LNG) and Compressed Natural Gas (CNG): In practice, LNG and CNG are replacements for petrol / diesel and suitable for heavier freight vehicles. Natural gas is intrinsically cleaner than petrol / diesel, but since it is a fossil fuel it is not renewable. It also contributes to global warming. At a local level it produces much less pollution than petrol or diesel and its use attracts financial incentives. The fuel tanks are specially designed for intense refrigeration (LNG) or high pressure (CNG) which makes them larger and heavier.

(d) Ethanol and Methanol: Can be used as alternatives or complements to petrol (gasoline) and can give less local pollution. If the raw source is petroleum then they are not renewable. Fortunately, they can be produced organically; e.g. from sugar cane etc., and then they can contribute in reducing climate change. Producing these alcohols organically can also bring economic benefits to rural developments by way of benefiting farmers.

(e) Hydrogen Fuel Cells: Fuel cells are not, strictly speaking, renewable or alternative energy, they are engines which convert energy; the energy source is actually hydrogen. Potentially this system can give clean and efficient energy. This technology is complex and research and development is needed to make them more feasible. The hydrogen fuel can be derived from a variety of sources. The hydrogen fuel cell is an electrochemical energy conversion device. Hydrogen and oxygen are fed into opposite sides of a cell, which are separated by a membrane permeable to hydrogen ions but not electrons. Hydrogen gas molecules entering the anode side of the cell are ionized in the presence of a catalyst to form protons and electrons. The protons pass through the membrane to combine with the oxygen and electrons to produce water at the cathode. The electrons flow through an external circuit from the anode to the cathode, creating an electrical current, which powers an electric load such as a motor. If the source of energy is renewable then we have a desirable situation but if it is petroleum derived, for example, and then it is not a renewable system. There are developments which indicate that fuel cells may provide an important source of energy in transport applications.

(f) Hybrid engine systems: This system uses internal combustion engines in tandem with battery-driven electric motors, to conserve energy. A few cars are now in production with this system. The batteries are charged from the kinetic energy of the vehicle (e.g., when braking). Manufacturers use Nickel-metal Hydride batteries (designed, it is claimed, to last as long as the car) and these are charged by the petrol power unit (via an alternator) during normal driving. Power is delivered to the wheels by either unit or both depending on the demands such as acceleration, during cruising or braking. Currently the vehicles are dearer, and this system only mitigates the problem of carbon emissions. It does not solve the emission problem. Nevertheless, the energy that is regenerated is truly green. One advantage of the electric system over the petrol engine is the torque available over a wide speed range; a normal car has several gears to narrow the speed range in use.

Source : <http://saferenvironment.wordpress.com/2008/12/11/pollution-from-motor-vehicles-urgency-of-development-of-environment-friendly-cleaner-system-for-road-transport/>