

FROM PETROL TO ELECTRICITY

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For centuries people were looking for fast and convenient way to get to their destination. Prehistoric people could use their legs only. Then humanity was using domesticated animals like horses, donkeys and camels. Then the first steam engine was created but it was not really convenient to use them for motion, so it outdated soon. The invention of a petrol internal combustion engine was the next stage in the development of vehicles and it is still up to date. Nowadays people understand that the world should be pure. We start to appreciate clear places, especially clear and fresh air. So the next stage is the creation of environmentally friendly and convenient vehicles. An example of such a kind of vehicle is an electric car.

An electric car is an automobile that is driven by an electric engine instead of an internal combustion engine. Its source of energy is usually a battery. Now these cars are becoming more common because of the movement for pure world, especially in highly developed countries. Electric car is not a prototype, it exists. But there are some disadvantages and difficulties, which should be done away before the mass production of electric cars starts.

It is interesting to note that an electric car was created before the internal combustion engine. The first electric car was produced in 1841. Initially maximal speed and power reserve were equal for cars with an electric engine and an internal combustion engine. The main disadvantage of the electric car was a complicated system of charging in the beginning of 20 century. It was partially solved by a rectifier invented in 1906, but that didn't solve the problem at all. Electric cars were quite common. There were 70.000 electric taxis in New York in 1910 and even an electric bus in Russia. But then the internal combustion engine was modified and electric cars disappeared.

The revival of interest in electric vehicles was observed in 1960s because of environmental problems and the rising cost of fuel. But then it declined again. Today the interest to these vehicles has been renewed because of the same reason.

The most of electric car's manufacturers are well-known because they produce not only electric cars. They produce high quality cars with an internal combustion engine. This is "Renault", France; "Nissan Motor", Japan; "Ford Motor Company", USA; "Honda Motor Company", Japan and some others. But "Tesla motors", USA is a leader in manufacturing electric cars in our days. It produces electric cars only. This is new company, but it develops fast. Their main goal now is to produce 500000 automobiles budget class per year. And this is the only company which can provide an infrastructure for electric cars charge.

Charging electric cars has been a problem for a long time. In comparison with a car with internal combustion engine it still has a lower power reserve and charging time, but these problems are almost solved. The latest "Tesla motor's" car called "Model S" has 300 kilometers of power reserve while an average car has about 2000 kilometers. And next generation of "Model S" will have a power reserve about 500 kilometers.

Charging has always been a weak point of electric cars. Now full charge of "Model S" from usual socket (220 V) takes 6 hours. But it's difficult to pass a long distance (for example from one city to another). So there are 2 projects to solve it.

"Tesla motors" company starts their project called "Supercharger". All the states in US will be equipped with charging stations, where Tesla car's users can charge their automobiles for free. Superchargers provide half a charge in as little as 20 minutes and are strategically placed to allow owners to drive from station to station with minimal stops. Now there are 82 charging stations in North America, so West and East Coast are connected by a "tunnel" of charging stations.

The second part of "Supercharger" program called "battery swap". At the charging stations (or Tesla stations) you can replace your battery with a new one. It would be made by mechanical equipment used on the "Tesla motors" factories. And it takes about 1.5 minutes which is faster than

to fill a gas tank. The only decision you need to make when you come on one of Tesla stations is to prefer a faster or free way of charging.

There are some advantages of electric car:

- No harmful emissions (high ecological compatibility);
- simplified service;
- low fire hazard and explosiveness in a crash (because of no explosive petrol in the car);
- simplicity of construction and reliability as a result;
- the ability to charge from the usual socket;
- high efficiency (90-95%);
- low noise level;
- cheapness (in purchase, service and charging);
- rapid acceleration.

But there are some disadvantages:

- low energy density and small power reserve as a result;
- high weight of batteries;
- difficult manufacturing and disposal of batteries;
- waste plenty of battery power for heating and interior lighting (It is especially important in cold countries);
- the need to create an infrastructure for recharging;
- overload power networks with mass use;
- the degradation of the battery in the cold;
- pedestrian danger (because of low noise level).

Because of a small power reserve electric cars have not become widespread yet. But there is a solution: cars with hybrid engine. The hybrid engine includes both advantages of an internal combustion engine and an electric engine. When the speed is 50 km per hour and lower the electric engine works. When it is higher or battery is low the petrol engine works and electric engine is charging. This system lets us reduce fuel consumption by converting kinetic energy of motion into electric one and then to use it. Fuel consumption reducing leads to a reducing harmful exhaust. It is important also because efficiency of the internal combustion engine is lower at a low speed. But it is much more expensive to buy a hybrid car than to buy a usual car. That is because of the design complexity of the hybrid car. There is both an internal combustion engine and an electric engine, so you should pay for the engine twice. And it takes much space to install two engines into one car. That's why hybrid cars are not widespread yet.

Electric cars are not in great demand yet because of access to fossil fuels. But in the near future their production is sure to increase due to environmental concerns and economic considerations.

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