

УДК 629.331.5

Dmytro Maslov¹, Olena Syvachuk²

¹student of group E-417a, National University «Zaporizhzhia Polytechnic»

²senior teacher, National University «Zaporizhzhia Polytechnic»

HYBRID VEHICLES: NOTHING BUT BENEFITS OR JUST ANOTHER COMPROMISE SOLUTION?

Hybrid cars are becoming more popular and more common. Basically, a hybrid car is one that uses two or more engines, i.e. an electric motor and a conventional engine (either petrol or diesel). The electric engine powers the car at lower speeds, and the gas engine powers it at higher speeds. A hybrid car, like Toyota Prius and Civic Hybrid, not only conserves fuel but also produces less CO₂ emissions.

Though hybrid vehicles are now growing in popularity still few people are actually using them mainly due to the lack of knowledge of how hybrid vehicles work and whether they are as good as other gasoline-powered vehicles. While the technology has existed since the early 1900s, it has only been in the past decade or so that the price of their manufacturing has brought them into the range of possibility for the average driver.

First of all, let's figure out how the hybrid-electric vehicle works. Hybrid-Electric Vehicles (HEVs) combine the advantages of both the internal combustion engine or gasoline engines and electric motors that use energy stored in batteries. The key areas of performance are regenerative braking, dual power sources, and less idling.

Now, let's move to some features of HEVs and start with the regenerate braking. A hybrid electric vehicle cannot be plugged in for the battery to charge. The battery is charged with the help of regenerative braking and by the internal combustion engine. It helps to transform kinetic energy produced by the moving car into electrical energy stored back into the batteries. The electric motor powers the vehicle as well as resists its motion. When you apply brakes to slow down, this resistance slows down the wheel and simultaneously recharges the batteries.

The next feature is dual power. Depending on driving circumstances, power can come from either the engine, motor or both. The electric motor is in use at low speeds. When you pick up the speed, your combustion engine kicks in. Afterward,

the electric battery recharges itself using the combustion engine. The electric motor also provides additional power to assist the engine in accelerating or climbing.

When the vehicle comes to a stop, it automatically shuts off the engine and restarts it when the accelerator is pressed down. The battery not only powers auxiliary loads, but it also reduces engine idling when it stops. These features altogether result in better fuel economy without hampering performance. A hybrid car is best defined as a vehicle that has an engine that can switch between fossil fuel and an alternate fuel source.

Let's consider advantages of HEVs. First of all, one of the biggest advantages of a hybrid car over a gasoline-powered car is that it runs cleaner and has better gas mileage, which makes it environmentally friendly. Secondly, HEVs are made up of lighter materials, which means less energy is required to run. The engine is also smaller and lighter, which also saves much energy.

Furthermore, the electric motor assists the internal combustion engine in case of accelerating, passing or climbing a hill. Hybrid vehicles can be driven entirely with electricity. This usually happens while moving at low speeds, when the engine is idling at a stoplight or when the engine starts up.

However, there is nothing perfect in our world and everything has some disadvantages.

To begin with, the combined power of both is often less than that of a gas-powered engine. It is, therefore, suited for city driving and not for speed and acceleration. Secondly, extra weight results in fuel inefficiency and manufacturers cut down weight, which has resulted in motor and battery downsizing and less support in the suspension and body.

Third serious drawback is higher maintenance costs. The presence of a dual engine and continuous improvement in technology make it difficult for mechanics to repair the car and maintenance cost is also much higher. It is also difficult to find a mechanic with such expertise.

The biggest drawback of having a hybrid car is that it can burn a hole in your pocket. Hybrid cars are comparatively more expensive than a regular petrol car and can cost \$5000 to \$10000 more than a standard version.

To sum up all above, a hybrid car is an interesting compromise solution for those who prefer calm city driving style, for those people who need a car just to take them from point A to point B. It would be nice for people who care about environment and want to try something new and unusual, to get new, unique experience. A hybrid car is definitely an interesting thing to try, especially if you have an everyday car and want to buy it as a second one.

However, if you like fast driving, regularly have to face bad road conditions or just don't have enough money to buy and maintain a hybrid car, you'd better choose a petrol or a diesel one.