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Commentary

# Modern Engine Technology and its Components

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## 1. Description

Over the years engine technology has advanced significantly moving from two-valve systems with gravity fed combustion mixtures to contemporary fuel injection systems. Electric car technology has also advanced significantly totally replacing the requirement for a combustion engine.

### 1.1. Hybrid

A hybrid system combines two different power sources. In the current market, this primarily entails a standard gasoline combustion engine that is assisted by an electric motor; however some employ a diesel engine. The electric motor aids in takeoff and can drive the car entirely on electricity on the highway and under certain low load circumstances. By doing this, fuel consumption is greatly decreased. There are already hybrid models available in Australia from Toyota, Lexus, BMW, Mitsubishi, Holden, Nissan and Land Rover, and more automakers are hopping on board every year.

### 1.2. Direct Injection

The era of the traditional carburetor system is over. Air and gasoline are precisely sprayed into each cylinder as part of the direct injection process (combustion chamber). Even though it's a great technology, Electronic Fuel Injection (EFI) merely sprays the mixture into the intake manifold before being drawn into each cylinder as the valve or valves open. Modern vehicles now have much better fuel efficiency due to the new technology because it uses a more precise fuel injection system. Additionally, the fuel requirements for each cylinder are detected and managed more precisely. Modern diesel and turbo-diesel engines have adopted the technologies like Turbo Direct Injection (TDI).

### 1.3. Variable Valve Timing

It is as complex as it sounds. But it has evolved into one of the contemporary engine's most ground breaking innovations. It functions by continuously adapting valve control to the circumstances in order to offer more usable power and torque over the entire rpm range assisting in the reduction of emissions and fuel consumption by about 7%. It is given a fancy name by all businesses. Mitsubishi refers it as MIVEC; Honda calls it VTEC, while BMW calls it VANOS. It is also referred to as VVT.

### 1.4. Turbocharging

In the 1970's, when they were initially used in road vehicles, turbochargers were often exclusively seen in sports cars. The term "turbo" quickly gained popularity as a sign that a

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product was hip or athletic. But today, turbochargers are a need for increasing performance, lowering fuel consumption and cutting emissions. They function by using a fan that is powered by the exhaust gases to blow the air and fuel combination into the engine.

### 1.5. Cylinder Deactivation

Most often, this technology is used with bigger engines like V6s and V8s. A car needs a little amount of power to maintain a constant pace when travelling along the interstate. Driving a V8 car, for instance, doesn't take a lot of power to keep the car moving. When the driver is not exerting much effort, cylinder deactivation effectively shuts off two or four cylinders automatically. When necessary, most systems will switch from eight to four cylinder combustion without the driver even realizing it. Everything transitions smoothly and seamlessly. The ultimate result is a four-cylinder engine's economy when travelling on the freeway.

### 1.6. Electric Vehicle (EV)

EVs are only recently starting to gain popularity. These are battery operated devices that only use electricity to operate. The car moves ahead as a result of the electric motor turning the wheels. Zero fuel use and exhaust emissions are the key advantages. The battery is a flaw, when it runs out the automobile will not start. The distance travel is limited in an EV because there aren't many nearby charging outlets. Many nations are working to modernize their infrastructure to accommodate EVs.

### 1.7. Hydrogen internal combustion engine

While some trials are being conducted with hydrogen combustion engines, which are essentially Electric Vehicles (EVs), others are being conducted with hydro fuel cell technology. These still use an engine design resembling that of a gasoline engine, but instead of gasoline, they use hydrogen. It ignites in a very same manner; however it generates around 20% more power. This is a tremendous technological advance, since hydrogen emits no pollutants at all making it fully eco-friendly. The main issue is that scientists are still working to develop a reliable method of storing hydrogen and making it as convenient as gasoline in terms of gas stations and other infrastructure.

### 1.8. Hydrogen Fuel Cell

Fuel cells function more like an electric vehicle than the hydrogen combustion process. Utilizing hydrogen, a chemical reaction is sparked, resulting in the discharge of electricity. Similar to an electric vehicle, an electric motor is then powered by this electricity. The best feature of this design is that there is no need for fuel cell recharging. Instead, it only has to be refueled with hydrogen which could provide its own set of challenges. However, because no pollutants are produced during this process, it is one of the most environmentally friendly means of propulsion. Depending on how the electricity is generated for the particular region recharging electric vehicles can be harmful to the environment.