

# Comparission between hyper and regualar engine cars literature reviews example

[Technology](#), [Development](#)



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## **Introduction**

Globally, the automotive industry is possibly the most complex and largest undertaking in industrial history. The complexity of its production has resulted to cars whose main concern was the right price, performance, reliability, safety, market attraction and emission hence ignoring other major concerns like energy security and climate protection (Lovins & Cramer, 2004). Regular (conventional) cars use petroleum products (petrol and diesel) as fuel. (50by50 campaign) research showed that light duty vehicles are expected to triple by 2050. This translates to increased prices, environmental pollution, energy crises, reductions of oil reserves and eventually global warming. These has necessitated the need to search for alternative fuels as well as solutions to address these problems (IEA 2008;

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WBCSD 2004b). Hybrid Electric Vehicles (HEVs), Electric Vehicles (EVs) and Hyper Cars are some of the solutions.

## **History of Hyper Cars**

Amory Lovins, a physicist, started research on hyper cars in 1991 while heading a nonprofit research center, Rocky Mountain Institute (RMI). It was during this time that he developed the concept of a hyper car (2). The features of this car included light weight (Ultralight) (Lovins 1991), low drag, HEVs with a simplified software design. Two years later he published his initial findings of the hyper car (Lovins & Barnet, 1993; Lovins et al. 1993). These findings were not patented but rather made public so as extend his research by other scientists. Through the 1990s, Lovin's concept was further defined and developed in the RMI center (Lovins 1995; Fox & Cramer, 1997; Hawken et al 1999). In 1999, RMI developed technologies (ultralight, autobody, integration of whole platform & systems) which helped in the provision of engineering services geared to production. In the year 2000, Hypercar Inc. under the leadership of Lovin developed a car that incorporated these technologies which addressed the overriding problem of fuel consumption. Since then, new developments have continued to emerge in light of research carried out by Lovins. This has led to adoption and more improvements by other automotive companies thus producing different types of hyper cars. Some of the examples of the hypercars in the market currently include: Koenigsegg Agera R, Bugatti Veyron Grand Sport Vitesse, Porsche 918 Spyder, Mercedes CLK GTR AMG, Pagani Huayra among other

## **Comparisons between hyper and regular engine cars**

Hypercar describes a vehicle that merges a hybrid-electric drive-system, ultra-light and ultra-aerodynamic design and other features to attain high fuel efficiency to low emissions ratio. They are made to achieve high efficiency without compromising on other characteristics like performance, safety, durability, affordability and comfort. Hypercar vehicles fuel economy is improved by reducing the aerodynamic drag, rolling resistance, drive-system inefficiencies (engine and other mechanical components that connect the engine to the wheels), energy lost during braking and accessory loads (lights, climate control, instrumentation and audio system). It is founded on a combination of aerodynamic design and ultra lightweight, special low-rolling-resistance tires, hybrid electric propulsion and efficient accessories.

### **Ultralight Construction**

The hyper cars unlike regular engine cars are made to have a light weight. Less weight is designed to reduce effect of tire rolling resistance. improve system efficiency, and most of the power is utilized in acceleration rather than being lost in braking. Ultra light weight design is achieved through replacing steel with new materials, for example using polymeric composites, in the car's body and chassis (Lovins 1995). Making components lighter allows other components to be made lighter too. This is called " mass decompounding. Regular engine cars have heavier materials used during their manufacture unlike the ones used in hypercars. Hypercars are 50-65 percent lighter that regular engine cars of the same size.

## **Aerodynamics and Rolling Resistance**

Regular engine cars are already fairly sleek. For hyper cars, aerodynamic drag is further cut by about 40-50 percent or more, through smooth underbody, cab-forward design, a tapered rear end, aerodynamically designed air intakes minimized body seams, suspension, and wheel wells. These have been achieved without significantly restricting the car attractive looks and design.

Rolling resistance is affected by the type of tires, amount of friction in idle brakes and bearings mass of the vehicle and the type of tires, In addition to these, wheel bearing assemblies , special tires and brakes are employed to minimize overall rolling resistance by up to 50 percent. For regular engine cars, these features are not emphasized .

## **Hybrid-Electric Drivesystem**

Another difference between a hypercar and a regular engine car is seen from its drive-system. For regular engine cars, automotive drive-systems consist of an internal combustion engine (ICE) that is mechanically fixed to the drive wheels through a multi-speed transmission

## **Accessory Loads**

Currently regular engine cars designs pays little attention on minimizing cooling and heating loads or by making their accessories energy-efficient. For hypercars vehicle, power is minimized for propulsion. Standard accessory loads becomes a prime part of total power consumption. Through vigilant choice and mixing of efficient components, on the other hand, the accessory

loads are reduced to no more than about twenty five percent of the current average, while at the same time providing equivalent or better functions

## **Fuel consumption**

One of the main reasons for that necessitated the development of hyper cars was the issue of fuel efficiency. A summary of two conventional (regular) cars are as illustrated in the table below.

Hyper cars are considered to be fuel efficient at the same time giving a high engine power out (torque & RPM) as compared to regular cars. A case in point is a Nissan GTR and Koenigsegg Regera. Nissan GTR can give 542hp with a torque that can reach 612Nm. It's a fast car with a very high fuel efficiency.

Koenigsegg Regera is a good example of a hyper car currently in the market. It is an extremely lightweight car designed for racing. Koenigsegg can attain 1100 hp on 91 octane with a 1250Nm of torque. A summary is as shown in fig. 2 below.

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