



The Petrol-Diesel See-Saw and Gasoline Particulate Filter

If, like me, you are concerned about driving a car which has minimum impact on the environment and on health, you may be dismayed at the way in which petrol engine and diesel engine technologies have swung in and out of favour over the last decade or so.

Back in the early 2000s, the UK changed the way in which it charged road tax (vehicle excise duty) to a CO₂ based system in order to reduce the emissions of the greenhouse gas CO₂. The CO₂ emitted by an engine is directly related to fuel efficiency, so diesel engined vehicles, with better MPG and lower CO₂ emissions were indirectly promoted and UK (and other) manufacturers invested heavily in diesel technology. In 1994 just 7.4% of UK cars were diesel. By 2013 this had risen to 34.5%. So we all shouted 'hooray', we're emitting less CO₂ and we've reduced our carbon footprint.



Then, with a massive diesel market established, concern was focused on the high levels of Nitrogen Oxides (nitrogen oxide and nitrogen dioxide, collectively know as NO_x or NOX) and of particulates which diesel engines emit. The particulates can be largely dealt with by the DPF (diesel particulate filter) but NO_x emission remains a serious concern for health, particularly in the large towns and cities of the UK. This is where 'Adblue' comes in. This is an aqueous solution of high purity urea (no, it's not cow p*ss!) which is injected into the exhaust system to reduce oxides of nitrogen into nitrogen and water. Even so, many councils are actively discouraging diesel cars by placing parking levies on diesel car owners. Many councils are actively discouraging diesel cars by placing parking levies on diesel car owners. Also, the road tax (VED) advantage of a new diesel engine car largely disappeared in April 2017, with the introduction of the new VED rules.



OK! So, let's all go back to petrol engines with lower emissions of particulates and NO_x. But what about poorer fuel efficiency and consequently higher CO₂ emissions? Well there have been big improvements in this area. Developments of a technology known as gasoline direct injection, GDI, which uses injection principles more similar to a diesel engine, have made petrol engines significantly more efficient, and so reduced their CO₂ output. They're not as fuel efficient as a diesel equivalent, but not too far off. Now, just about all manufacturers offer direct injected petrol (GDI) engines in vehicles within their range, notable examples being VAG group's TSi and TFSi engines and Ford's Ecoboost engines. But there is a problem...

Compared to conventional injected petrol engines, GDI engine emit much higher levels of particulates. Up to 10 times higher than modern diesel engines. As GDI engines become more common, the particulate emissions is causing serious concerns for health. In response to this, manufacturers are improving combustion chamber design but, in addition, many are calling for the application of particulate filters to these vehicles, similar to the DPF on a diesel vehicle. However, because the exhaust temperature on a petrol engine is higher than on a diesel, it is anticipated that there will be fewer problems with filter regeneration on short journeys. Both Mercedes and VAG have announced the introduction of particulate filters to their range of petrol cars. Mercedes will begin in 2017 with all petrol versions of the S-Class and other models being added in following years. From June 2017, VAG Group introduced particulate filters on the 1.4TSi engine in the VW Tiguan and the 2.0TFSi in the Audi A5.

So is it game, set and match to the petrol engine? Well not necessarily. Mercedes' say that their current investment in combustion engines will keep them efficient until "the widespread market success of electric vehicles". So maybe manufacturers are beginning to see the long term winner as being one of the alternatively fuelled new comers, bringing the 100+ year supremacy of the internal combustion engine (petrol or diesel) to an end. But don't hold your breath. Unless you're in a city centre surrounded by high levels of NOX and particulates.

Jeremy Howell 2017

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