http://www.theaa.com/motoring_advice/news/biofuels.html 06/02/14

Biodiesel and Bioethanol

Information and advice from AA Public Affairs

UK motorists and the AA understand the need for development of car fuel technologies to **reduce harmful emissions**. More than a third of cars in Britain run on diesel, mainly because it offers significantly better fuel consumption, but also because that better fuel efficiency cuts CO_2 emissions.

In the search for alternative fuels or ways to improve existing fuels, fuel technologies have looked to bio-sources, alongside other technologies such as fuel cells, hydrogen and LPG. By virtue of development and use in other countries, two particular biofuels are being offered in the UK: **bioethanol** and **biodiesel**.

The introduction of these fuels is set against the experience of "greener" Liquid Petroleum Gasoline (LPG) in recent years, when the extra cost of the vehicles, and the eventual removal of grants and reductions in fuel duty concessions, undermined confidence in a proven fuel amongst motorists and particularly fleets.

Although the application of biofuels has been successful in other countries, motorists are presented with a number of options: improved diesel engines, direct injection petrol engines, electric hybrids and biofuels. The key questions that motorists ask are:

1. does it work?
2. does it suit my circumstances?
3. when will it be available, along with adequate refuelling facilities? and
4. how much will it cost me?

In helping the motoring public to embrace the new greener technologies, the AA will continue to provide an unbiased view of the pros and cons of new fuels and engine technology. It will also listen to its members and seek the best outcome for them and the **environment**.

In looking at the two biofuel alternatives, the AA is offering the following information to motorists:

Bioethanol

At the moment **bioethanol** is available in some areas of the country, including Somerset where it is being tested by the county council, local police force and other users. The AA Driving School also evaluated some bioethanol cars in that area as fuel availability is good.

Some branches of Morrisons, mainly in the Norfolk area, used to sell bioethanol but stopped doing so at the end of 2010. Morrison's decision is a reaction to the withdrawal of government subsidies for biofuels, meaning that the cost of biofuels is set to rise - the current 20p tax relief on B30 and other biofuels on the forecourts is to be removed in April 2011.

Blends of Bioethanol

Bioethanol comes in two blends: **E5** and **E85**, differentiating between the percentage blend of ethanol with petrol. E85 is the higher concentration used to power "flex-fuel" vehicles, which are also capable of running on standard unleaded petrol. E5 is a low blend of bioethanol and petrol, for use in conventional petrol engines, although this kind of fuel is usually marketed as normal unleaded petrol.

The bioethanol, currently imported, will soon be produced from UK-grown **grain and sugar beet**, and is mixed with petrol in the ratio 85% bioethanol, 15% petrol. A 100% ethanol fuel is not suitable for use in this country – ethanol does not vaporise well so petrol is needed to aid cold starting.

Ethanol blended petrol in France

A new type of fuel, **SP95-E10** (Sans Plomb 95 Octane, Ethanol 10% = Lead Free 95 Octane containing 10% of Ethanol) is now being sold throughout France.

This fuel is not suitable for use in all cars and you should check compatibility with your vehicle manufacturer before using it. If in doubt use the standard **SP95** or **SP98** Octane unleaded fuel which continues to be available alongside the new fuel.

Car manufacturers producing 'flex-fuel' models

Saab (its whole range of new vehicles) and Ford (Focus Flex-Fuel) manufacture cars which are suitable to run on **bioethanol E85**. Others, including Citroen, Volvo and Renault are also introducing flex-fuel vehicles. The fuel systems of these vehicles are treated to resist the corrosive effects of bioethanol and the electronic control units (ECU) of the engine management system is re-programmed to take advantage of the higher octane rating of bioethanol. You can't use bioethanol E85 in a car with a fuel system designed for existing petrol engines.

Take-up of this fuel will depend on its availability, the cars themselves do not cost very much more than the equivalent petrol model. However, **conversion** of an existing car which was not designed to run on bioethanol E85 is not really economically viable.

Performance and MPG

Although the **octane rating** (that's its resistance to damaging engine 'knock' or pinking) of ethanol is higher than petrol – so engine performance may be better, the **energy content** is lower so vehicles which run on E85 (the bioethanol mix) will do fewer miles to the gallon.

Biodiesel

Biodiesel is manufactured from oil seed rape, waste cooking oil, palm oil etc. Modern (HDi) diesel engine pumps run at very high pressures. All diesel pumps depend on the fuel itself for lubrication – diesel is oily, **biodiesel** has very good lubricating properties.

However, viscosity of the fuel is critical for correct pump operation. Many pumps, especially those fitted to the latest **HDi engines** will not run for very long on pure biodiesel. Biodiesel has a **higher water content** than conventional, fossil fuel diesel so the engine oil and filters will need changing more frequently to avoid corrosion. A small amount of this water may be left in the biodiesel by the production process, but it is more likely to be absorbed by the fuel during storage. Energy content is again lower than that of conventional diesel and consequently fuel consumption is higher.

Biodiesel blends

Biodiesel is being produced in three main blends: **B5**, the five per cent mix with diesel, **B30**, the 30 per cent mix, and **B100**, which is pure biodiesel, containing no 'fossil fuel' diesel. **B5** is already being retailed on many UK filling station forecourts, but **B30** is a more specialist fuel and is not as widely available. Whichever blend, the biodiesel should meet the standards of **BS14214**.

Some diesel engines will run on biodiesel, but if you choose to use this fuel it is essential you **check with the vehicle manufacturer** that biodiesel is suitable for your car.

Future legal requirements for biofuels

Currently fuel companies are permitted and, from 2010, will be legally obliged to mix five per cent bioethanol with 95 per cent petrol and five per cent biodiesel with 95 per cent conventional diesel. Mixes at these levels will not do any damage to fuel systems, nor require any adjustments, and will be a standard ingredient of the fuel. Renault and Peugeot-Citroen are now offering some of their vehicles with the ability to use B30 - a 30 per cent biodiesel/70 per cent conventional diesel mix.

Biofuels may help to ease our reliance on fossil fuels and biodiesel is an excellent way of reusing waste cooking oil, but at current rates of fuel use they are not the complete answer. There is simply not sufficient land to grow enough crops for both food and fuel.