Dorset Agenda 21

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BIOFUELS FOR VEHICLES: A BRIEFING SHEET

The road transport network accounts for around 25% of all UK greenhouse gas emissions. If we are going to tackle climate change, we must address the issue of transportation fuel. The current practice of burning fossil fuels releases stored carbon into our atmosphere, resulting in a net gain in atmospheric carbon dioxide and exacerbating global climate change. The burning of biofuels however releases carbon, as carbon dioxide, that was recently incorporated into growing plants and that can be reabsorbed in the growth of the next plant, thus making them effectively carbon neutral.

WHAT ARE BIOFUELS?

Any fuel derived from biological sources, predominantly plants, rather than from geological sources, as is the case with fossil fuels.

Biofuels can be classed as sources of renewable energy and can be used to replace fossil fuels in a variety of situations. They can be produced from many different types of plant, a lot of which are suitable for cultivation, making their widespread use viable. Existing biofuel crops include Miscanthus (elephant grass), short rotation willow coppice, oil seed rape, and wheat. Liquid biofuels for transportation are growing in popularity and there are currently three main types: ***biodiesel***, ***vegetable oil***, and ***bioethanol***.

Biodiesel:

- Diesel made through the chemical processing of vegetable oil. More specifically, vegetable oils *(*which are tri-esters*)* are put through a transesterification process, by reaction with caustic soda and methanol, that removes the glycerine (produced as a waste product) and leaves new (single) esters – methyl esters – which are used as biodiesel. You start with thick (viscous) liquid tri-ester (vegetable oil) and finish with a thin (less viscous) mono-ester – methyl ester (biodiesel).
- Potential biodiesel sources include soybean, rapeseed, palm, sunflower, and hemp.
- Biodiesel can be used to replace, or in combination with, conventional petroleum based diesel. It is a golden-brown liquid.

Vegetable oil:

- Unprocessed vegetable oil, either new or reclaimed/recycled and carefully filtered.
- Potential vegetable oil sources include rapeseed, sunflower, corn (maize), and peanut oil.
- Rudolf Diesel, the inventor of the diesel engine in 1892, had intended that his engine would run on peanut oil.
- Vegetable oil can be used to replace, or in combination with, conventional petroleum based diesel, **but the engine must be modified – see below.**

Bioethanol:

- Ethanol produced through the fermentation of the sugars and starch found in plants.
- Potential bioethanol sources include maize, wheat, potato, and sugar beet.
- Bioethanol can be used to replace, or in combination with, conventional petrol, **but a different engine must be used for high % of bioethanol – see below.**

WHAT ARE THE ADVANTAGES OF BIOFUELS ?

- Emissions are carbon neutral: for example 1 tonne of biodiesel used helps to reduce carbon dioxide emissions by up to 2.5 tonnes, compared to fossil fuel diesel.
- Biodegradeable and non-toxic.
- Comparable or cheaper cost than mineral counterparts, even with tax.
- Potential new crops for struggling agricultural sector.
- Potential use of food surpluses.

DO I NEED TO CONVERT MY ENGINE ?

Biodiesel can be used in any post **1996** diesel engine without conversion, however it is advised that the standard of the biodiesel be checked. If it does not conform to the recognised quality standard for diesel fuels, EN590, it may have implications for any warranty. Even if it does not affect the warranty, it may be better to mix low-grade biodiesel with mineral diesel. It is also advised that, if you run on biodiesel, you change your fuel filter after 1000 miles as a precautionary measure, since the new fuel will dissolve out waxy deposits that fossil fuel diesel leaves in the engine and then it leaves these in the fuel filter. Effectively, your new fuel cleans out your engine – it gives it a detox!

Vegetable oil is thicker *(more viscous)* than a diesel fuel and without engine modifications would quickly clog up your engine. Engine conversions can be done on *most* diesel vehicles, but the type of conversion, and therefore the cost, is dependent on vehicle type and make and can cost around £995. This cost can be reduced if you buy a kit (cost about £ 500) and do the conversion yourself. Once converted, these engines can run on vegetable oil, biodiesel, and mineral diesel. The conversion consists of adding a pre-heating system to lower the viscosity of veg oil to that of diesel. This system may be electrical or use hot water from the engine.

Bioethanol can be used in any unleaded petrol engine, **as a small %** in combination with petrol but some minor adjustments may be required to optimise engine performance. The maximum possible concentration of bioethanol in petrol in a normal engine is not yet known but it has been used across the EU in a 5% mix (E5) and up to 10% across the US (E10). Cars can be run on *85 % or even* 100% ethanol but they require different engines. This is now becoming an option with both Ford and SAAB developing biofuel cars (up to E85 for SAAB and E100 for Ford). 5 Morrisons stores within Somerset sell bioethanol on the forecourt - Bridgwater, Taunton, Yeovil, Weston Super-Mare, and Clevedon. S Somerset police run a fleet of 10 squad cars on E85 (85% ethanol)

IS IT LEGAL ?
YES! As long as all the tax is paid. Biofuels have a duty on them and purchasing from a reputable supplier should ensure this is included in the price you pay. If you make it yourself or buy it in a form not specified as fuel, e.g. vegetable oil from the supermarket, then you will need to complete simple self-declaration forms to pay the duty.

WILL THE PERFORMANCE OF MY VEHICLE BE AFFECTED ?
All the evidence suggests not. Acceleration, fuel economy, starting reliability and servicing requirements have all been monitored in biofuel vehicles and the feed back has been favourable. In general, people experience no loss of performance and some even note an increase in terms of fuel economy.

IMPORTANT THINGS TO REMEMBER:

- ***Check where your biofuel originated!*** The importation of cheap biofuels invariably requires the use of fossil fuels in transportation, so the closer to home you can source it the better. Furthermore, the intensive production of biofuels can result in severe environmental degradation (*e.g palm oil plantations)* So always try to find out where the product has come from and how it was produced. Remember that because somewhere processes and distributes fuels/oils it doesn't necessarily mean they grew the crop or sourced it locally.
- ***Switching to biofuels is only part of a solution!*** Reducing our societal fuel consumption is still necessary if we are going to *reduce* atmospheric CO_2 rather than just stabilise it. Using biofuels in your vehicle can be far better than mineral fuels but it should be recognised that conversion to the final product invariably requires some form of energy input (*especially with biodiesel)* So don't forget about efficient driving, lift sharing, public transport, cycling, and walking!
- ***This briefing sheet does not contain all the options!*** Other alternative fuels and engines are being developed all the time, for example **biogas,** which is the same as natural gas, methane, but is made from organic waste by a digestion process. Biogas is much used in China and India, but very little is produced in the UK at present.

USEFUL CONTACTS:
*To find out more about **biofuels** go to BABFO:* www.biodiesel.co.uk
*For information on **biofuels and grants** and to find your closest biofuel outlet visit the Energy Saving Trust:* www.est.org.uk/fleet or call the transport helpline **0845 602 1425**
*You can also find out more about where to get **biodiesel** at:* www.biodieselfillingstations.co.uk
*To find out more about **vegetable oil conversions** and get a quote for your vehicle contact Dieselveg of Wolverhampton, tel: 01902 450001, at* www.dieselveg.com *or VOIL, in Somerset:* www.voil.co.uk

*To see **biogas vehicles** being used locally visit Organic Power Ltd, Horsington, Somerset:* www.organic-power.co.uk *. They are developing a process to make biogas from organic waste.*
***Suppliers of biodiesel** in Dorset are:*
Tlc at Bridport: www.bridporttlc.co.uk *and*
bioADVANCE at SW Biofuels, Gillingham: www.swbiofuels.co.uk

John Tomblin, Project Officer, DA 21. 29th August 2006

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