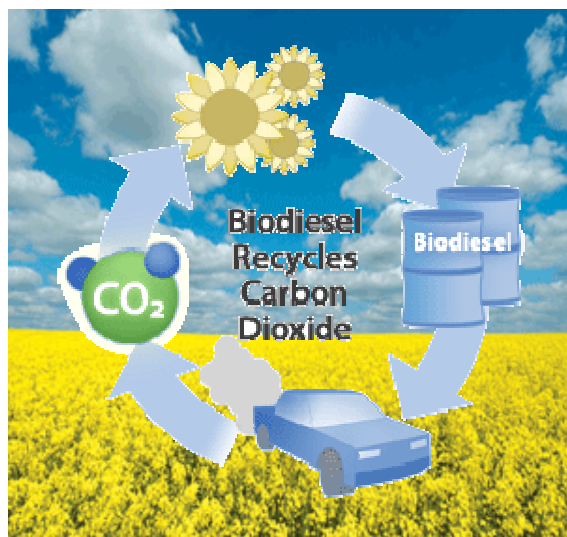


Bio-Diesel



Bio-Diesel is a renewable fuel produced from vegetable oils such as those from rape & sunflower seed. It can be used as an efficient heating oil but it's greatest potential benefit is as a transport fuel where no changes to the distribution system are required avoiding expenses.

In the transport sector it may be used both when blended with fossil diesel fuel and in pure form.

Tests undertaken by motor manufacturers to blend Bio-Diesel with Diesel oil at ratio's between 2% and 30%, referred to as B2 and B30, have resulted in guarantees for each type being used in certain cars.

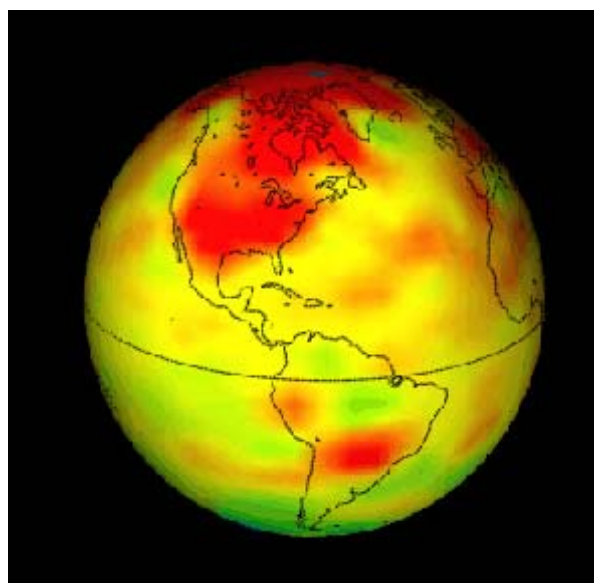
Minor modifications to seals & piping are required for use at 100% pure, unless specifically guaranteed by car manufacturers.

Why Use Bio-Diesel.

Bio-Diesel has been demonstrated to have significant environmental benefits in decreased global warming impact, reduced NOx & CO₂ emission, greater energy independence and a positive impact on agriculture.

Studies have estimated that the use of 1 kg of Bio-Diesel leads to the reduction of some 3 kg of CO₂ it is extremely low in sulphur, has a high lubricity and is biodegradable.

Increased use of Bio-Diesel helps the UK meet its emission reduction target as agreed under the Kyoto agreement and reducing emission also helps alleviate various human health problems such as asthma.



Used vegetable oils can also be recycled as feedstock for Bio-Diesel production. This can reduce the disposal of used oils in the environment.

Under the current Common Agricultural Policy, the arable raw materials needed for Bio-Diesel production may be grown on set-aside land which would otherwise be taken out of production. The amount of Bio-Diesel that could be produced from this land have been calculated and amounts to 1 hectare of rapeseed = 1,322 Litres, 1 acre of rapeseed = 535 Litres

Under appropriate economic conditions, production could represent a significant absorbing potential with huge tracts of waste land being put to good use all across the European Union.

Bio-Diesel production currently uses around 1.4 million hectares of arable land in the EU.

Bio-Diesel Production in the UK

There are approximately 644,000 hectares of suitable, available set-aside land in the UK, with almost twice this area of grassland that might offer be additional potential. The most suitable crops to be grown for bio-diesel would be rapeseed. Other potential crops would include sunflowers, linseed and castor, however rapeseed is by far the most suitable for UK agriculture.

Year	Yield (T/ha)
1998	2.9
1999	3.2
2000	2.9
2001	2.6
2002	3.4
Average	3

The Table right shows the average annual rapeseed yields since 1998, the average yield over this time is 3 tonnes per hectare.

Assuming that all 644,000 hectares of UK set-aside land is used to produce Bio-Diesel, 1,932,000 tonnes per year could be realised. The production process requires the vegetable oil to be extracted from the seed by crushing the seed and by solvent extraction with a 40% oil content available by mass, or 772,800 tonnes of raw vegetable oil per year.

There is around a 97% conversion from raw vegetable oil to biodiesel during the transesterification process, hence volume of Bio-Diesel would reduce to 749,616 tonnes or 851,836,000 litres per year.

In 2002 the UK released 19.764 billion litres of diesel for consumption with an energy content by volume of around 37.9 MJ/L hence the total energy of diesel in 2002 was 749 billion MJ.

Bio-Diesel has an energy content by volume of around 35.6 MJ/L, hence the energy contained in 0.85 billion litres of Bio-Diesel would be 30.3 billion MJ equivalent to approx 0.8 billion litres of diesel or 4% of UK demand.

So, to summarise.....

**0.8 billion litres of Diesel could be saved each year if
all the set-aside land in the UK were used to produce Bio-Diesel !**

Limitations and Assumptions

However, there are many assumptions and limitations that must be taken into account. The problem of monoculture is one and the increased objections to mass culture of oilseed rape would need to be addressed. It is unlikely that rapeseed would be grown on 100% of the set-aside land, however if it was grown with wheat and sugar beet crop rotated could be managed, reducing community concerns. This is a big assumption and would require trials to assess its feasibility.

The Bio-fuels industry in the UK is in development and there are only a handful of road side filling stations, but increasingly positive interest, including that of a major UK transport operator and politicians is encouraging. Greater demand for bio-fuels coupled to tax incentives could give a much needed boost to the development of these environmentally friendly alternatives.

Sources <http://www.biodiesel-expo.co.uk>
<http://www.esru.strath.ac.uk>



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