

Cleaner Transport and Biodiesel

Transport and climate change

Transport accounts for around 30% of the UK's CO₂ emissions with the overwhelming majority via personal vehicles. The simplest measure you can make to reduce the environmental impact of your transport is to choose a vehicle with the highest efficiency i.e. one that consumes the least fuel. In addition to the environmental benefits it makes good economic sense. For example, many small/medium-sized passenger vehicles/vans have typical average, combined cycle, fuel consumption figures of around 55 miles per gallon (12miles/litre) whereas many others will average nearer 32mpg (7miles/litre). Therefore driving 10,000 miles per year @ 90p per litre will cost around £750 and £1285 respectively i.e. a difference of £535 per year and 42% higher CO₂ emissions.

Cleaner fuels and vehicles	Best application
Liquefied petroleum gas (LPG)	-to smaller vehicles such as cars and light vans that have high mileage.
Natural gas	-for heavy goods vehicles with depot based refuelling sites
Biodiesel	-existing diesel engines without modification
Electric vehicles	-urban driving - set routes or short trips
Electric hybrids	-currently only available in passenger cars
Fuel cells	-demonstration "zero emission" vehicles - not yet commercially available

Biodiesel

What is biodiesel?

Biodiesel can be produced from the oil of crops including oilseed rape, sunflowers, and soya beans, as well as from waste cooking oil.

None of these oils should be used in engines un-processed as they can leave damaging glycerine deposits. Instead the oils are reacted with methanol to produce methyl esters - rape methyl ester, or RME is most common in the UK.

Biodiesel sold at filling stations in the UK is a blend of 5% biodiesel and 95% ultra low sulphur diesel that conforms to the current diesel specification, EN 590.

What are the environmental benefits of using biodiesel?

Because the crops used to make biodiesel take in carbon dioxide when they grow, biodiesel is considered a renewable fuel. Studies show that biodiesel reduces the fine particles emitted from diesel vehicles. As these particles are tiny and can penetrate deep into the lungs, biodiesel can help to improve local air quality. However, oxides of nitrogen, a smog forming gas, are slightly higher than cleaner or ultra low sulphur diesel.

Biodiesel is highly biodegradable and therefore does not accumulate and pollute soil and waterways.

How much does it cost to run a vehicle on biodiesel?

Good quality biodiesel (fuel standard EN 14214) tends to cost more than regular diesel to produce. Because of this, the Government reduced the tax on biodiesel by 20 pence per litre in July 2002 to compensate for the additional costs and

All the advice and information provided is free and impartial and while every effort is made to ensure that the information given herein is accurate, no responsibility is accepted for any errors, omissions or misleading statements and no responsibility is accepted in regard to the standing of firms, companies or individuals mentioned.

Cornwall Energy Efficiency Advice Centre, South Crofty House, 1 South Crofty, Tolvaddon Energy Park, Camborne, Cornwall, TR14 0HX.
Telephone - Advice: 0800 512012. Office: 01209 614975

encourage production and use of this fuel. As a result, current biodiesel pump prices are roughly the same as standard diesel.

Where can I buy biodiesel?

Available from certain filling stations - <http://www.biodieselfillingstations.co.uk/>

What else do I need to know about biodiesel?

When used in 5% blends with conventional 'mineral' diesel, biodiesel behaves almost identically to conventional diesel, meaning that most motor manufacturers warrant their vehicles to run on the fuel. In fact, some studies have found the lubricating properties of biodiesel can make engines run more smoothly.

Pure biodiesel degrades rubber components and is thicker than mineral diesel when cold. Even so, some engines can successfully run on 100% biodiesel – the engine manufacturer should be able to tell you or try some of the biodiesel websites.

Most vehicle manufacturers warranty their vehicles to run on the 5% blend. If a manufacturer is unsure, consumers should check that the biodiesel they purchase conforms to the recognised quality standard for diesel fuels, EN 590

LPG

Costs	
Additional cost for a new LPG car or van (compared to conventionally fuelled vehicles)	£900 - £1,700
Converting an existing petrol car or light van to run on LPG	£1,700 to £2,700
Running costs	An LPG car costs approximately 30% less to run than petrol, and approximately the same as diesel.

What else do I need to know about LPG vehicles?

There may be a slight reduction in the amount of available boot space due to the installation of LPG tanks.

LPG vehicles drive like a petrol vehicle and are subject to the same maintenance schedules.

No gas-powered vehicles are currently allowed through the Channel Tunnel, although this is being reviewed.

Most petrol-engine vehicles can be converted to LPG but no funding assistance is available.

Electric and Hybrid Fuel Vehicles

Purely Electric vehicles

Vehicles that rely on electricity as the sole form of propulsion still experience many problems such as lack of range but they are currently the most environmentally friendly type of vehicle. The cars that are available have large numbers of batteries and a motor uses the stored energy to drive the wheels. As the amount of research into electric vehicles increases, particularly the batteries, so do their performance when compared to a traditional combustion engine driven car. The main advantages and disadvantages of a currently available electric car can be seen below.

Advantages

- Low running costs (on average, one sixth that of running a petrol car, zero road tax)
- Zero direct emissions (There are emissions from the power station, which effectively provides the electricity that the car runs on. "Green" energy tariffs reduce this effect)
- Ease of use: No gearbox or clutch means they are simple to drive.

All the advice and information provided is free and impartial and while every effort is made to ensure that the information given herein is accurate, no responsibility is accepted for any errors, omissions or misleading statements and no responsibility is accepted in regard to the standing of firms, companies or individuals mentioned.

Cornwall Energy Efficiency Advice Centre, South Crofty House, 1 South Crofty, Tolvaddon Energy Park, Camborne, Cornwall, TR14 0HX.
Telephone - Advice: 0800 512012. Office: 01209 614975

- Ease of service: Fewer moving parts than a petrol car so does not wear out as easily.
- Quiet: No engine noise.
- Refuel at home overnight from a 13amp socket!

Disadvantages

- Range: Probably still the biggest problem with owning an electric car. The average range is between 40 and 80 miles before recharging needs to take place.
- Recharge Time: between 30 minutes and 9 hours.
- Acceleration: Compared to a petrol equivalent, the acceleration of an electric car can be poor. (0-60mph in 20+ seconds)
- Speed: The top speed is below 80 miles an hour in most cases.
- Initial cost: The average price of an electric car is around 30% more than the petrol equivalent.

Some Examples

G-Wiz electric car £6000

'Think' electric car



Citroen Berlingo

The capacity of electric, diesel and petrol versions remains the same at 3.0 m3. The 27 nicad batteries that power the Electric



Berlingo are located under the bonnet and under the rear load floor. Payload is 500 kg. The Electric Berlingo is intended to suit utility, municipal and other urban operations. With a top speed of 100 kph (approx 60mph) and 0 to 50 kph (approx 30mph) in 8.4 seconds, the Electric Berlingo has a practical range, depending on operating conditions, of up to 100 km (60 miles). Powered by a 28kW motor, the Electric Berlingo features a regenerative braking system which comes into effect when the throttle is released; the electric motor then acts as a generator to recharge the batteries and to provide engine braking when slowing down and going downhill. All the driver convenience functions of the other Berlingos are retained, such as power steering and servo brakes. From flat, the batteries can be charged in nine hours using a normal domestic power supply and plug. The batteries can be fast charged for ten minutes to give 20 km (12 miles) of operation.



Operates a fleet of Peugeot 106 and Citroen Berlingo electric cars and vans. An average range of 50 miles, the ability to recharge from virtually any socket (or to recharge to 80% from a special charging unit in 30 minutes) gives a practical option for local transport or predictable journeys.

All the advice and information provided is free and impartial and while every effort is made to ensure that the information given herein is accurate, no responsibility is accepted for any errors, omissions or misleading statements and no responsibility is accepted in regard to the standing of firms, companies or individuals mentioned.

Cornwall Energy Efficiency Advice Centre, South Crofty House, 1 South Crofty, Tolvaddon Energy Park, Camborne, Cornwall, TR14 0HX. Telephone - Advice: 0800 512012. Office: 01209 614975



These vehicles are available for test drives and trials. Similar vehicles will be available for purchase soon. ecodrive aims to develop vehicles with a more acceptable range (100 miles+) and performance equal to conventional models. For more information, contact ecodrive, PO Box 255, Penzance TR18 9AA Tel: 0845 466 3835 Fax: 0845 466 4624 email: matthew@eco-drive.co.uk or visit www.eco-drive.co.uk

There have been a number of demonstration vehicles and projects both in Europe and USA although few have made it to the UK. Most vehicles on offer now (or to be released in the near future) are either small vehicles aimed squarely at city use, where they attract exemptions from parking and congestion charges, or the super-car market with hugely expensive but very fast cars!

Solectria: Founded in 1989, Solectria manufactures many different products for use in electric, hybrid and fuel cell powered vehicles. Some of their vehicles, which they have sold all over the world, are shown below. A Solectria car achieved a range record of 373 miles on one charge! <http://www.azure-dynamics.com/>

Hybrid vehicles:

A hybrid is basically a vehicle that utilises 2 forms of power supply. Currently, hybrids use a petrol or diesel engine as well as an electric power source. There are 2 main ways in which a hybrid can work. The petrol/diesel motor can power an alternator, which charges up the batteries. In effect the batteries power a motor that drives the

All the advice and information provided is free and impartial and while every effort is made to ensure that the information given herein is accurate, no responsibility is accepted for any errors, omissions or misleading statements and no responsibility is accepted in regard to the standing of firms, companies or individuals mentioned.

Cornwall Energy Efficiency Advice Centre, South Crofty House, 1 South Crofty, Tolvaddon Energy Park, Camborne, Cornwall, TR14 0HX. Telephone - Advice: 0800 512012. Office: 01209 614975

wheels and the petrol/diesel engine keeps the batteries charged up.

The combustion engine and the electrical system work either individually or together. When the car is moving at slow speeds, the electric motor works on its own in providing power to the wheels of the car. When the speeds increase, the combustion engine provides power to the wheels thus giving similar levels of performance to a conventional car. Power from the combustion engine is also converted into electricity in order to keep the batteries charged up. This means that there is normally no need to charge up a hybrid car like a purely electric car although to do so can increase its efficiency and lower emissions.

Toyota Prius

The Prius is remarkably similar to the Honda Insight in the way that it works. It uses a 1.5 litre VVT-I engine combined with efficient NiMH batteries. At slow speed the electric motor provides the power to the wheels. Under heavy acceleration and at higher speeds the petrol engine is also in operation. When the car is coasting or during braking the batteries are recharged using regenerative braking. When the car is stationary the petrol motor is switched off so that no fuel is wasted and no emissions are being produced. The engine is limited to 4500 rpm so as to reduce emissions. The car has been designed with weight in mind, as many of the components are very light. This aids the low fuel consumption figure.



<http://www.toyota.com/prius/>

More Information

Useful websites;

The Motor Industry Research Association website	http://www.mira.co.uk/
Driving the Future - An American website with lots of background information	http://www.drivingthefuture.com/
Company that converts petrol and diesel vehicles to electric	http://www.avt.uk.com/
Campaigning organisation and support group for people interested in electric vehicles	http://autos.groups.yahoo.com/group/electriccarsUK/
Runs courses on making various types of biofuels + contacts for conversion kits, pumps, heaters, filling stations etc	http://www.bio-power.co.uk/events.htm
DIY - How to make your own biodiesel from veg oils	http://journeytoforever.org/biodiesel_make.html
US contacts with some useful advice	http://www.kk.org/cooltools/archives/000456.php
Manufacturer	http://www.rixbiodiesel.co.uk/
Manufacturer	http://www.ebony-solutions.co.uk/
All things about biodiesel	http://www.vegburner.co.uk/biodiesel.htm
Community Energy Plus – Energy Advice	www.cep.org.uk

All the advice and information provided is free and impartial and while every effort is made to ensure that the information given herein is accurate, no responsibility is accepted for any errors, omissions or misleading statements and no responsibility is accepted in regard to the standing of firms, companies or individuals mentioned.

**Cornwall Energy Efficiency Advice Centre, South Crofty House, 1 South Crofty, Tolvaddon Energy Park, Camborne, Cornwall, TR14 0HX.
Telephone - Advice: 0800 512012. Office: 01209 614975**