

Regionalised Biodiesel Manufacturing in Australia  
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A number of years ago I became interested in renewable fuels in particular biodiesel and began running workshops at the University of Western Australia to teach people how to make biodiesel. These workshops continue to run at about a frequency of three per year at the University of Western Australia.

Why biodiesel? This is a very good question and worth looking at this in some detail. Biodiesel in particular should be promoted as a significant part of the future liquid fuels solution as it has significant environmental benefits. But firstly why biofuels at all? In summary I would put the following at the top of the list of reasons:

- Diminishing oil reserves – and the need for a sustainable replacement
- Environment - Global warming
- Sustainable resource
- Cultural demographics
- Economics
- Practical

I am sure you can think of some of the detail behind most of these points. For me cultural demographics and practicality are major positives for using biodiesel and I will explore these further.

Biodiesel is the only fuel that addresses all of the sustainability criteria effectively. A biodiesel industry has the following advantages:

- Renewable resource
- Recycles carbon within the biosphere
- Efficient
- Simple – to manufacture and use – it can be sustainable!
- Competitive - pricing
- Uses existing technology – blending with petrodiesel is possible
- Uses existing infrastructure
- Is ready to go now – there is no need to modify your vehicle

What about ethanol or hydrogen. At this time hydrogen for the fuel cell driven buses in Western Australia and else where is extracted from fossil oil. The hydrogen needs to be very pure and the process of extraction and purification is extremely expensive not only in terms of capital equipment but also energy. The whole process of producing hydrogen is very inefficient and I suspect always will be. The net result is that the “green” hydrogen powered buses on our streets are in fact by far the worst vehicles in terms of pollution and green house gas emissions.

Fuel cell technology currently uses very rare elements and is very high tech and so will be owned by a few major corporations. Under the hydrogen scenario we will be a captured market to these corporations. An objective look at the technology shows that this is the single most important issue driving the technology for corporates.

Ethanol is also a biofuel. At this time our petrol powered cars in Australia can take up to about 15% ethanol before serious engine design modifications are required. To be produced efficiently and profitably ethanol requires very large capital intensive factories, of the order of \$100 M to build. These large centralised factories are, and will be, again owned by large corporations, particularly large oil. They require huge areas of very uniform quality monoculture to feed their raw stock inputs. These large monocultures have very detrimental environmental effects, they also have serious negative effects on human society, as is now being experienced in the sugar cane plantations and African palm oil plantations of tropical Asia. They remove from general public view and critique the environmental cost of generating the fuel. They pose a serious threat to the environment, especially as large oil has shown its inability to factor ethical environmental issues into its operations eg. Nigeria, Venezuela, Iraq, Indonesia, Alaska and so on.

Unlike hydrogen and ethanol, biodiesel can be manufactured on almost any scale and be economically competitive. So what? Well this means small factories can be build throughout our communities rather than in our cities. There is no nexus between the very centralised resources or sophisticate manufacturing plant required for oil wells, oil refineries and ethanol factories. Small factories using locally produced raw materials bring the effects of producing and using the resource squarely into the view of the general public. This is good because the fundamental problem with our age is that we do not see the effects, for example, of a coal fired power station or a chemical factory on our environment, they are carefully concealed from our immediate view and so are out of sight and out of mind. The relative costs of Biodiesel, ethanol and hydrogen are shown in Figure 1. Biodiesel is very competitive on the basis of the cost per unit of energy produced; it is one of the cheapest fuels to produce. In Figure 2 have added the hydrogen bar for comparison.

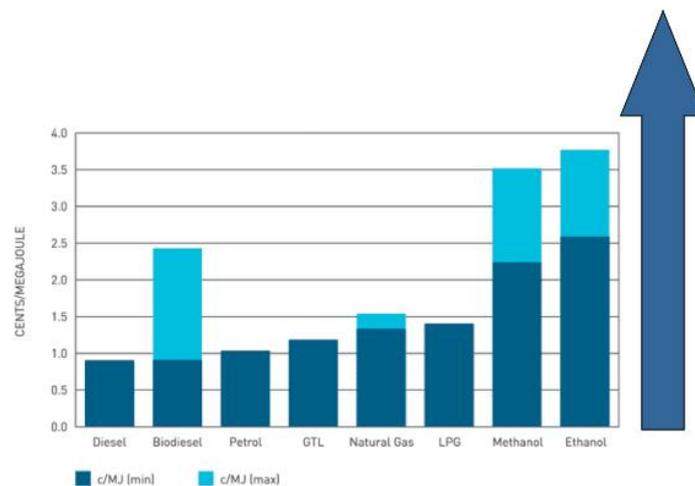


Figure 1. The relative costs of biodiesel, ethanol and hydrogen

Note: Prices of petroleum fuels vary with international oil prices and exchange rates. Minimum and maximum prices for biofuels and natural gas-sourced fuels reflect large variations in feedstock prices and/or throughput volumes. Based on an oil price of US\$35 per barrel and an exchange rate of A\$1 = US70cents.

[http://www.dpmc.gov.au/publications/energy\\_future/chapter4/8\\_alternative.htm](http://www.dpmc.gov.au/publications/energy_future/chapter4/8_alternative.htm)

Biodiesel can use a diverse range of input materials, this helps to maintain cropping diversity and to make the resource more reliable. If production is regionalised then cash that would normally flow to cities can be diverted and used in local communities creating industry, employment and improving the amenity of these communities. This would be great benefit to the struggling Australian farming sector.

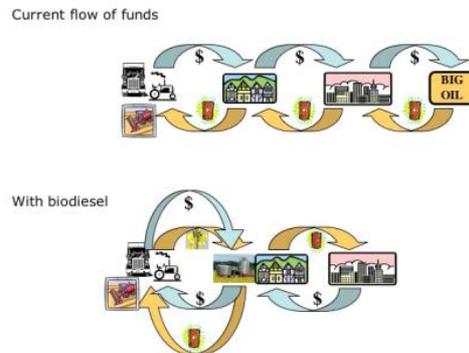


Figure 2. The money/resource flow

We need sustainable solutions – not just clean and cheap ones. The environmental issues we face are a symptom of our culture, they are not a cause. They are a symptom of a culture that overuses resources, that does not appropriately value energy and that has over populated the planet. The solution is not to treat the symptoms but to work on the cause. We clearly need to change our culture.

One of the major tasks we need to undertake is to decentralise production of almost all goods and bring the impact of the production these goods into view of the general population so they can make appropriate decision on how a resource may be used and exploited.

Biodiesel is the only fuel currently available that can effectively do this. It can connect people with the impact of consumption on the environment. This is best done by having decentralised and locally owned production facilities and cropping. Biodiesel is a very simple, reliable and accessible technology and it allows independence for local communities. It is also a very efficient fuel, as a comparison below between two vehicles of the same model except for engines shows.

Vehicle	Range per litre	Fuel production
VW Golf, 2 litre turbo diesel	4 litres per 100 km	\$0.90 biodiesel/litre
VW Golf, petrol equivalent	7.5 litres per 100 km	\$2.60 ethanol/litre

The diesel car is approximately four times cheaper to run if run on biodiesel compared to petrol car running on ethanol.

What about petrol hybrid cars? With these you can expect around 17 kmpl. Diesel-powered cars, like the VW Golf can achieve a performance of around 25 kmpl. It is interesting to note that modern diesel cars when compared to a current hybrid car have:

- More power

- Lower fuel consumption
- Lower emissions
- Lighter vehicle
- Simpler engineering
- Cheaper to run
- Cheaper to manufacture
- More flexibility in town and highway

Current hybrid car's only advantage is marginal and is only in very heavy traffic congestion.

With all this in mind you would expect the Australian government to assist with the introduction of a new biodiesel industry. The reverse is in fact unfortunately the case. The Australian Federal Government's response, under Howard, to this new industry has not just been poor it has been viciously misleading and obstructive. Its policies have been seriously detrimental to Australia's interests and to the benefit of large oil.

I will outline some of the main features of the Howard Government's policies with regard to biodiesel.

In May 2003, The Hon Dr David Kemp MP Environment and Heritage and Hon Peter Costello MP Treasurer announced a comprehensive package of Budget measures to support the production and use of biofuels "*... from 18 September 2003, Government will apply excise of 38.5c/litre on biodiesel whether pure or blended at the same rate as diesel*". The immediate effect of this "double speak" policy is to increase the user price of biodiesel by 38.5 c per litre. This clearly does not help the industry. Lets be clear about this – this is a disincentive for the biodiesel industry.

Most people are not aware that LPG (which comes from oil wells) has not been excised for nearly 30 years in order that it may gain market share to become commercially viable. LPG is not renewable or sustainable; it is a fossil fuel that adds to green house gas emissions. Most people are also unaware that LPG is worse than petrol for green house gas emissions. This has made LPG cheaper than biodiesel. Note this is also a disincentive for the biodiesel industry.

Excise relief (Cleaner Fuels Grant Scheme (CFGs)) may be available for biodiesel that meets the Australian Standard 2003. This relief from excise will eventually disappear in 2015 and at this time the excise on biodiesel will be 30% higher than that on LPG. Why excise biodiesel before it even enters the market place? Why excise it at a higher rate than LPG? (can you think of a reason? – oil lobbying). Note this is also a disincentive for the biodiesel industry.

The Australia Standard 2003 for biodiesel has been made inordinately difficult to meet. For example the standard requires producers to measure cetane number of biodiesel. At the time of writing the standard there was no equipment in Australia to do this, in fact there were only 23 machines in the world to do this. The measurement is not required for petrodiesel (why is this? - oil lobbying). Most of the performance requirements in the Biodiesel Standard far exceed those for petrodiesel, making its environmental performance vastly superior to petrodiesel. It also adds to the cost of

production and adds a significant testing overhead. Note this is also a disincentive for the biodiesel industry.

The Cleaner Fuels Grant Scheme was introduced as an incentive to manufacturers of biodiesel, that is to encourage the production of cleaner fuels. There is also, and has been for many years in one form or another, an Energy Grants Credit Scheme (EGCS) or similar that is a rebate on excise for users of fuel for primary production or mining.

The Federal Government's Fuel Excise Simplification bill 2006 resulted in a major restructuring of the excise treatment for biodiesel. The consequences of the Fuel Tax Bill have been to fundamentally shift the customer base for biodiesel in Australia and this has negatively impacted on the viability of the industry in this Country. Investment in the biofuels industry has been severely negatively impacted. It is important to note that the Treasury Department drafted the Fuel Tax Bill 2006 to create a "level playing field" between biofuels and fossil fuels. The biofuels industry, less than a decade old, is now expected to economically compete against an industry that has been established and operating for over a century. Note this is also a disincentive for the biodiesel industry.

The bill has effectively removed almost all incentive to make biodiesel in regional centers by redefining the CFGS as an excise relief (which it never was) and disallowing the EGCS where it is available. It has made biodiesel more expensive than petrodiesel for many regional areas of Australia. It has forced production capacity into the cities in the form of large centralized facilities. These are by nature publicly listed and are being bought up by large oil. Large oil will then own, control and manipulate the industry for its own ends. It already is. It will also corporatise farming, it already is, and this will lead to massive and environmentally destructive monocultures. Note this is also a disincentive for the biodiesel industry.

The Federal Government is in the process of rewriting the Australia Standard again. This is of great concern as the timing of this initiative by the Department of Environment & Heritage will negatively impact on the industry while it is still desperately trying to adjust from the last large oil sponsored government assault. Note this is also a disincentive for the biodiesel industry.

The language used in the call for comment on the standard by the Federal Minister for environment, Ian Campbell, is ominous. It says things like "*...achieve fuel quality standards for diesel/biodiesel blends that meet the needs for optimum vehicle and environmental performance*" - this is fine but why not do this for petrodiesel? Petrodiesel is significantly more toxic, carcinogenic, polluting and causes enormous green house gas problems. The environmental performance for biodiesel already far exceeds that for petrodiesel. Note this is also a disincentive for the biodiesel industry.

The document also says "*...to ensure only petrodiesel/biodiesel blends of the highest quality are available*". The plan is to lock in certain blends of petrodiesel/biodiesel when there is no need to. The problem is that petrodiesel is often at the very extreme of the Australian Standard for petrodiesel quality parameters. Biodiesel can have different requirements for the same parameters and the requirement to meet the petrodiesel standard for blends means that it can, and will, often be difficult to implement the few arbitrarily mandated blends. If the Minister is truly concerned for

clearer fuel he should simply encourage maximum biodiesel uptake. Note this is also a disincentive for the biodiesel industry.

There is also much misinformation about biodiesel, much of it is spread by governments in Australia but also by large oil, motor vehicle companies and other associated industries. Biodiesel is clean, cheap efficient and does not destroy your car. In Europe all car manufacturers have warranted their vehicles for biodiesel. Nearly all cars, trucks and farm machinery from the US and Europe is shipped to Australia with a biodiesel blend in the tank.

In Europe where ultra low sulphur diesel is in use, biodiesel is added as a lubricant to the fuel. This is because petrodiesel must have sulphur added, and not a trivial amount either – about 5 gram/litre, as a lubricant. So in fact not using biodiesel will cause your vehicle to wear out more quickly. At the same time we have a multitude of government, insurance, vehicle manufacture and oil companies telling the public that biodiesel will damage our vehicles. Note this is also a disincentive for the biodiesel industry.

In Australia the government gives support for almost any alternative to biodiesel, for example, for hybrid cars by halving the registration fee (Melbourne Dec 2006) or giving large oil tens of millions of dollars to build ethanol factories and repeatedly talking up ethanol. In 2006 the Howard Federal government announced that \$1.2 billion would be provided as a subsidy to convert vehicles to LPG. This is a direct subsidy for large oil. Similar support is not available for biodiesel – why is this? It is clearly the best performer both environmentally and commercially. Perhaps it is because biodiesel manufacture is possible on almost any scale and so cannot be centralised and controlled by large oil other than with government regulation to impose it.

Approximately 60% of all new cars purchased in Europe in 2006 were diesel – this is because they are significantly more fuel efficient than petrol cars. In Europe the production of biodiesel rose 65% in 2006.

Unlimited growth in a limited world is nonsensical. We either modify the way we live to make it sustainable or keep the system we have (growth fuelled by institutionalised and legitimised greed – is this what Milton Friedman gave us?) and occasionally take the Marxist path (destroy it all so we can rebuild it again – a bit like the Hindu pessimist's view of the wheel of life, birth and rebirth).

Biodiesel like any other industry can be very destructive; we are seeing this now in tropical Asia with African oil palm, but it can also work. The biodiesel industry can be easily regionalised and so become community owned. It can reconnect people to their environment in ways the fossil oil and ethanol cant. In the final analysis it is not so much what the industry is, they all have environmental impact, but how it is implemented that is crucially important. If large oil controls the biodiesel industry its environment value will be defrauded and we will all lose. It is an industry that can be part of the solution, in the end we all have to use far less energy to be living sustainably.