Biofuels

Biofuels are regularly proclaimed as a way forward for the 'greening' of transport services. They have gained particular distinction within the EU and the US. The current generation of biofuels do produce significant carbon emissions when burned as a fuel but these emissions are considered as part of the "short term carbon cycle".

To be considered a carbon abatement option biomass for biofuel has to capture as much carbon in its growth as is to be released through the internal combustion of the fuel. Biomass growth must further capture the emissions resulting from the production of the biofuel.

The advantage of biofuels are they can be used as either pure or blended with other petroleum based fuels with often little or no modification to the engine. When blended with other fuels, biofuels can reduce emission as a percentage of its concentration within the fuel, assuming the biofuel itself is climate neutral.

The 2008 Gallagher Review calculates that biofuels have the potential to emit 338-371 million tonnes of carbon dioxide globally less each year than the fossils they replace[1] . To be considered a sustainable option biofuels must meet carbon capture requirements but also have to address significant other issues.

Additionally the growth of plant material for biofuels must be replaced with new growth and from a global perspective it is important that the use of land to create biofuels does not increase the price of food due to competing land uses.

Many of the first generation biofuels do not address all these concerns or could not be produced in great enough quantity to replace all oil based fuels. As a result scientists are looking at new ways to produce more sustainable biofuels.

Second Generation Biofuels

Second generation biofuels are being developed that address the sustainable issues of the first generation biofuels. Much of these biofuels utilise the traditional non-food parts of plants and utilize modern research and development to create fuel from materials previously never imagined as a fuel source.

Within Australia the production of one particular second generation biofuel is particularly promising. Significant potential is emerging in the use of algae.

"The feedstock with ultimately the most potential is algae... Algae can yield 100,000 litres of oil per hectare whereas the next best crop is palm oil at around 5,000 litres per hectare[2]"

Biofuel production from Algae will allow Australia to use its resources that it has in abundance; sunlight, non-potable water and land.

The South Australian Government is funding a $4.2m microalgae bio-refinery project with project partners SARDI, Flinders University, United Water, Flinders Partners and Plentex Ltd. In July 2012 SARDI reported a breakthrough in isolating and evaluated a 'super strain' of a native microalgae species.

1) http://www.dft.gov.uk/rfa/_db/_documents/Report_of_the_Gallagher_review.pdf

2) The Biofuels Association of Australia (2010)

3) SARDI (2012)

This strain has unusually high lipid and protein content meaning the microalgae has commercial potential with application across the full range of oil uses [3].

Biofuels will have to be sustainably produced in quantities far greater than produced today for it to replace traditional petroleum based fuels. In 2008 biofuel accounted only for 2% of transport fuel demand, but grew to nearly 3% by 2009. While this may not be possible in the near future, there are an increasing percentage of freight companies that are trialling biofuel vehicles within their fleet.

It is likely that within the next few years before biofuel are produced in significant enough quantity to fuel a significant percentage of the Australian transport industry that biofuel powered vehicles may become strategy for partial reduction of emissions through partial fleet rollout.