



National Implementation of Biofuels in Australia

A policy discussion paper

May 2010



1.1 Introduction

The Page Research Centre takes the position that ethanol and biodiesel blended fuels are an effective step toward reducing vehicle emissions of carbon dioxide. The Centre had identified a number of claims about the potential of biofuels to reduce carbon emissions. As a conservative estimate, if Australia were to adopt an E10 blended fuel nationwide it would lead to over 3 million tonnes of carbon dioxide abatement per year.¹ However, other sources suggest that this could even be higher. The Page Research Centre supports the immediate implementation of E10 and biodiesel into mainstream use in Australia. The Centre recommends moves toward an E85 blend be a national goal. While various State Governments have introduced mandates over recent years and Federal Governments have been active in supporting an Australian biofuels industry, the Centre believes that the current implementation process has not reached its full potential. This policy discussion paper aims at providing stimulus for a renewed effort to fast track the implementation of ethanol and biodiesel into mainstream use. The Centre acknowledges that the integration of new transportation fuels into Australia is a complex issue with a range of competing interests. However, the Centre's main concern is that those competing and vested interests may be slowing down the implementation of biofuels as they seem unable to compromise on a suitable implementation process. The current problem facing the development of ethanol and biodiesel implementation is that Federal Government has not taken leadership and not been decisive enough in supporting alternative fuels allowing interest groups to dominate and dictate timelines for a full implementation. Absent from the process, has been serious recognition of any evidence-based policymaking. Decisions, to date, have been piecemeal or politically driven. The Page Research Centre now calls on Federal Government to consider more pragmatic and decisive measures to encourage the uptake of E10 fuel blends and the development of greater biodiesel production suitable for rural and resource industries.

This discussion paper recommends a policy alternative as a means to stimulate interest and provide some direction. Its scope is limited to key areas identified by the biofuels taskforce chaired by Senator Fiona Nash. The Centre appreciates this is not an exhaustive discussion paper but rather considers the main issues inhibiting bio fuel uptake.

2.1 Security of Supply

Australia is already about 50 percent dependent on oil imports. By 2015 it is expected demand will require two thirds of our oil is imported. Consequently, the petroleum trade deficit could (depending on prices) increase from its current level of \$12 billion per year to \$40 billion by 2015.²

¹ <http://ethanolfacts.com.au/benefits> date accessed 22nd February 2010

² http://www.infrastructureaustralia.gov.au/public_submissions/published/files/266_australianassociationfortheconomyofpeakoilandgas_SUB.pdf Date accessed 22nd February 2010.

Increased imports would also increase the impact of future high prices and price spikes due to depletion of conventional crude oil reserves. Increased imports would make Australia more vulnerable to supply disruptions and the need for drastic action and intervention in the market.

The immediate option for increased energy security is the expansion of a local biofuels industry. Many have advocated that the establishment of a domestic biodiesel and ethanol production chain would assist in securing supply. In fact, security of supply appears to be the main argument for Government to encourage a domestic biofuels industry.

Biofuels are being introduced in a number of countries. The United States has mandated 36 billion gallons of biofuels per year (about 136 billion litres), most of which would be blended into petrol and diesel. This is equal to three times Australia's transport fuels consumption. The European Union has mandated that use of biofuels to reduce greenhouse gas emissions from road transport by 6 per cent annually by 2020. Canada is also aiming for 45 per cent of petroleum to contain an E10 blend by the end of this year. India has introduced a national mandate for biofuels with a target of 20 percent by 2017. The Philippines have had an E10 mandate of since 2007. Without doubt Australia is falling behind the rest of the world when it comes to adopting biofuels for transport use.

In the context of a national mandate there is strong debate about the possibility that a domestic industry could supply all of Australia's demand. The Page Centre has been unable to come to a conclusion on the domestic biofuel industry's ability to meet demand. The Page Centre has identified some suppliers who believe that imports would be necessary to meet even the current State mandates. Meanwhile, the domestic biofuels industry is adamant in their claims that they can meet domestic demand under a national mandate of E10 and B5.

Heather Brodie, CEO of the Biofuels Association of Australia stated:

Over recent years there has been debate between biofuels producers and retailers as to whether the domestic industry can supply all of Australia's future demand. The Biofuels Association of Australia is absolutely confident that Australia's domestic producers will be able to meet the mandated demands and beyond. Future capacity and production is already under construction or at design stage – however future investment appetite will be dependent upon a receptive Federal Government policy. The BAA highlights that there is currently an oversupply of product as Australia's retailers have been slow to fulfil their mandated requirements.³

However, another industry interpretation is that imports may be require (See graphs below)⁴

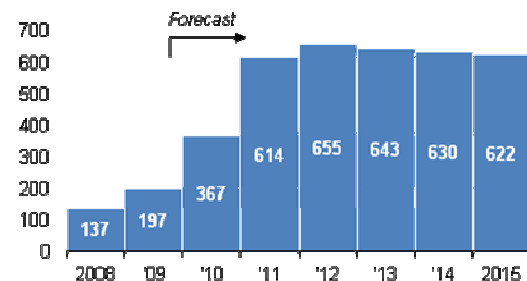
³ Correspondence to the Page Research Centre, 30th April 2010.

⁴ Source: INDUSTRY analysis, APAC Biofuels Consultants, DITRE

IMPORTS REQUIRED TO MEET DEMAND AND IMPROVE SUPPLY SECURITY

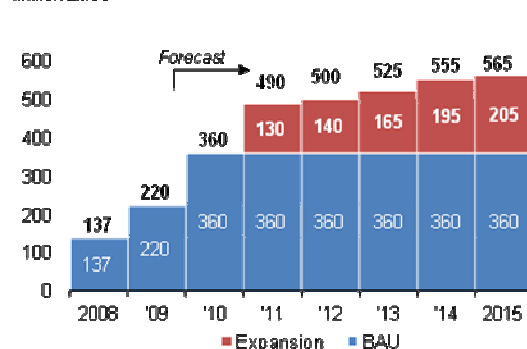
Australian Fuel Grade Ethanol Demand

Million Litres



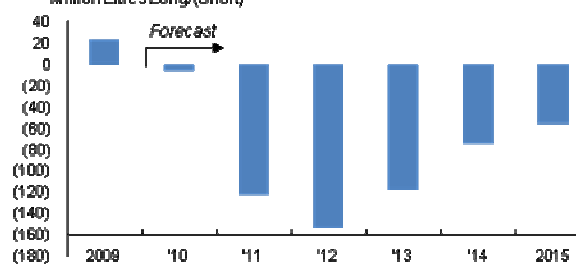
Australian Fuel Grade Ethanol Supply

Million Litres



Australian Ethanol Market Supply - Demand Balance

Million Litres Long/(Short)



SOURCE: INDUSTRY ANALYSIS, APAC BIOFUELS CONSULTANTS, DITRE

The Page Centre takes the position that domestically produced biofuels are preferable. A robust domestic industry will ensure security of supply but also provide opportunity for regional development. To ensure security of supply, further expansion of a local biofuels industry is necessary through excise rebates.

In a similar manner to petroleum it is probable to expect that in the long term import parity pricing will determine the pricing levels for biofuels. At present Australian petroleum prices are linked to international petroleum prices. Australia uses the Singapore Benchmark because Singapore is the largest petroleum refining centre and exporter in the region. It is probable that an ethanol international parity price could be based on prices set by Brazil (as it is the largest producer of ethanol) and perhaps in the long term, biodiesel will be set by Thailand. However, measures must be put in place to assist domestic industry expand before international market forces are introduced.

2.2 Food Security and Biofuels

Because Brazil uses sugar to produce ethanol, the price of ethanol is related to international sugar prices. Similarly, any food stock used for biofuels will also be subject to international commodity markets. The "food or fuel" argument represents a complex issue illustrative of the need for careful opportunity cost analysis. The production of biofuels, particularly ethanol, requires the fundamental resources of land and water which both naturally are required for the production of food. It is estimated that 1000 to 2000 litres of water are required to produce one litre of ethanol. Further the

corn required to fill just one standard urban vehicle tank with bio ethanol could feed one person in Africa for a year.⁵ In addition, the “first generation” approach to producing biofuels is to utilise common food crops such as corn. Consumers of those products fear shortages or a rise in costs if the same crops are used to make biofuels. These fears are being realised in the United States and Europe. According to the World Bank, US and EU, biofuel production was responsible for 70 to 75 per cent of the food prices rises. Corn is still 50 per cent above its 2003-2006 average. Based upon those suppositions the Page Research Centre approaches the issue of biofuels production with careful consideration. In undertaking its research the Centre acknowledges that most of the ethanol produced in Australia is made from molasses, sorghum and waste starch from wheat and the quantities are relatively small. Biodiesel is mainly produced from used cooking oil and tallow, with some canola. Subsequently, many of the concerns raised over EU and US production do not apply to the Australian experience.

While Australian production of biofuels use waste products, any importations may have been produced using raw materials which are in competition with food production. Without some guidelines or regulations on imports it would be difficult to ascertain if the imported biofuel had been produced from sustainable non-food sources. Therefore, through consuming imported biofuels, our consumption may indirectly cause food shortages or artificial rises in food costs. Consequently, it is vital that Government adopt a sustainability standard for domestic and imported biofuels.

Both corn in the United States and sugar in Australia and Brazil, proved natural choices as the bases for ethanol production as they both have historically experienced market gluts and low returns. Both industries have received government subsidies. In addition to their starch content, another benefit is that the production of ethanol provides a mechanism to develop those industries to be more self supporting. Subsequently, in terms of production shortages, the Page Research Centre sees no conflict with food and fuel in the production of biofuels using sugar cane or waste starch from wheat, but is concerned with the ongoing use of corn and its impact on long term food supplies.

Competition for land and water was identified as a real concern which may prove difficult to reconcile using “first generation” products. However, Australia is in a unique position of moving to predominately using materials which are often referred to as “advanced generation” sources. The Page Research Centre supports further research into algae, native grasses or plants which can be grown in marginal areas unsuitable for other agricultural production, as well as expanded use of waste materials, even household garbage. More research into using lignocellulose products for the manufacturing of biofuels is required in Australia. We have borrowed substantial overseas research which is putting our own industry development behind the rest of the world. We need to be a world leader in biofuel research and development.

The Page Research Centre recommends that biofuels produced domestically and imported meet a sustainability standard which includes a clause that R&D is supported into "advanced generation" biofuels.

2.3 Reduction of greenhouse gas emissions

Coalition policy is to reduce pollutant emissions by various means including direct action. The use of biofuels to partially replace petrol and diesel can reduce pollutant emissions by over 50 per cent for petrol and up to 85 per cent for biodiesel. In using a full life cycle analysis it has been shown that using lignocelluloses can reduce emissions by more than 90 per cent.

⁵ K Siddique, “Food versus Fuel” <http://www.news.uwa.edu.au/201002092143/institute-agriculture/food-versus-fuel>, date accessed 24th February 2010.

The Page Research Centre recommends that a national biofuels mandate serve as the cornerstone to reduce pollutant emissions from transport.

3.1 Consumer Education

Some of the greatest resistance to ethanol blends has come from sections of the automotive associations and the general public. However, most of these concerns were voiced in the initial period of introducing ethanol fuels. In the early years there were concerns from motorists that ethanol blends were causing problems for their vehicles. Most of the concerns had come from some providers mislabelling the blend. There were anecdotal instances of some service stations using an E20 blend but under an E10 label. Car manufacturers at the time were warning their customers that using blends over 10 percent, would void warranties and cause premature corrosion of metallic components in the fuel system. However, under the Fuel Quality Standards Act, it now requires suppliers to clearly label the ethanol content of the petrol at the pump. Another common complaint was that vehicles running on an ethanol blend were less fuel efficient, with E10 blends reducing fuel economy by 2-3 percent. However, the increase in fuel consumption of about 2-3 percent can easily be off set with better driving practices and not every vehicle is affected the same way. A benefit of an E10 blend with regular unleaded petrol is that it raises the Research Octane Number (RON) from 91 to 95 which in turn allows an engine to work at greater efficiency, although only in engines built to prefer higher octane fuel. Ethanol is also said to clean fuel systems and burns more completely, thus reducing the build up of carbon.

The concerns expressed about ethanol blends are based on early problems within the industry and concerns from car manufacturers. Most new cars are built to use E10 and popular cars capable of using greater blends will shortly be introduced. For example, Holden is about to release its E85 Flex Fuel Commodore with further models to follow. Essentially, the problems surrounding ethanol blends are matters of perception which can be overcome by better public education. The Page Research Centre identifies a leadership role for motoring associations, car manufacturers and even the motor racing industry. The V8 Supercars choice to switch to E85 is working well towards showcasing the performance of ethanol blended fuels and has a large sway over motoring enthusiasts. It is events like these and ongoing campaigns by manufacturers that will increase the public's confidence in the use of biofuels. However, like the introduction of unleaded fuel in 1986, it is unlikely full consensus will ever be reached which is why the implementation process needs to be driven by industry and Government with a conviction that the introduction of biofuels will significantly reduce carbon emissions and improve energy security.

4.1 Regional Development

The creation of a biofuels industry has a number of benefits for regional Australia. Most notably is the additional income source for farmers and the jobs created by construction and operation of refinery plants. There are a range of employment figures suggesting that a biofuels domestic industry would provide great employment opportunities in regional Australia. For example, if Australia was to produce 50% of its transport fuel from biomass we could create over 200,000 new jobs in regional Australian communities. Production of 7/8 billion litres of ethanol has created 195,000 jobs in rural American communities.⁶ The Page Research Centre believes similar figures could be emulated in Australia if support was given to expanding the industry.

⁶ [http://www.australianoilseeds.com/data/assets/file/0007/1105/Biofuels - Bob Gordon.pdf](http://www.australianoilseeds.com/data/assets/file/0007/1105/Biofuels_-_Bob_Gordon.pdf) Dates accessed 30th April 2010

The Page Research Centre supports the further development of community based biodiesel production but recognises there are some difficulties with small scale production. The Centre appreciates that some smaller scale biodiesel production (including on farm plants) may not be economically viable. Some have reported that biodiesel is only economic when mineral oil prices are high (US\$60 per barrel). However, with the current average price around US\$73 per barrel and long term trends showing even higher prices, the possibility of future investment in biodiesel looks increasingly realistic.

The Centre also anticipates a range of food for fuel issues for biodiesel because some of the main crops used internationally are canola oil, soy oil and palm oil. While these products may not be high in consumptive demand, they are competing for land and water along side food crops. Most Australian biodiesel is currently made from used cooking oil and tallow. The Page Research Centre supports developing a local biodiesel industry which uses non-edible feedstocks, such as pongamia and juncea.

The Centre supports a feasibility study into the possibility of developing regionally based biodiesel refineries able to use non-food feedstocks.

Section 2

Implementing Biofuels

The Page Research Centre supports increasing the adoption of biofuels in Australia and offers the following policy option for consideration. Central to the success of the implementation of biofuels across Australia, is Federal and State Governments addressing the issue from evidence-based policy perspective. The Page Research Centre is not convinced that there is any evidence to suggest that objections to a stronger mandate regime are anything more than ideological. In similar circumstances, unleaded petrol was introduced by mandate; there was consumer resistance at the time but through education and commitment the transition was accepted. The Page Research Centre views the implementation of biofuels in a similar vein and its historical analogy is suitable to the current climate.

The Page Research Centre recommends the following implementation policy:

- National ethanol mandates of 10 percent and biodiesel mandates of 5 per cent are introduced for 2015.

Some of the States on the Eastern Seaboard have or are in the process of introducing ethanol mandates. To ensure uniformity of these mandates, the Commonwealth government is required to introduce a national mandate that ensures each state has a 10 per cent ethanol blend. The introduction of such a mandate would form part of an overall general strategy to meet renewable fuel targets and reduce pollutants. The Transport Advisory Council has a role. In 1981 State and Federal Ministers for Transport met to address pollution problems. As a result of that meeting, a program was initiated to introduce unleaded petrol by 1985. A similar agreement could be made to implement biofuels.

Critics of a mandate suggest that they do not provide enough time for local producers to meet demand. Some industry representatives believe that a 10 per cent mandate would not be

obtainable by 2015 and targets should be set for 6 percent by 2015 and a 10 percent mandate by 2020. However, The Centre has found that most current local producers believe they would be able to meet a 10 per cent mandate by 2015 with domestic producers meeting a substantial amount of Australia's demand. The Page Research Centre has not been able to definitively settle the supply debate. It notes that some sources have suggested domestic production could meet a mandated demand in Australia while other sources suggest that imports will be necessary. Based on Australia's reliance upon petroleum imports, the Centre has taken the position that we may need to consider importation or plan for such an eventuality. Therefore, the question is: What assistance can be given to local producers to ensure they have enough market share to play a significant role in security of supply?

- Domestic production has its excise rebate decreased after five years.

To assist the further expansion of a locally based ethanol and biodiesel industry the Federal Government should consider the excise rebate remain at 2010 levels until 2015. The table below illustrates the possibility:

SYR DELAYED SCHEME	Ethanol net excise (Acpl)	Biodiesel net excise (Acpl)
Until 30 June 2011	0.00	0.00
1 July 2011 - 30 June 2012	0.00	0.00
1 July 2012 - 30 June 2013	0.00	0.00
1 July 2013 - 30 June 2014	0.00	0.00
1 July 2014 - 30 June 2015	0.00	0.00
1 July 2015 - 30 June 2016	0.00	0.00
1 July 2016 - 30 June 2017	2.50	3.82
1 July 2017 - 30 June 2018	5.00	7.64
1 July 2018 - 30 June 2019	7.50	11.46
1 July 2019 - 30 June 2020	10.00	15.28
From 1 July 2020	12.50	19.10

Through consultation with industry the Page Research Centre has established that most biofuels producers believe such a model would give them adequate time to establish the necessary plants and increase production.

In addressing the issue of excise, a problem emerges with how to treat imports. The Page Research Centre believes biofuel imports should continue to pay the current excise for a period of five years (2010-2015). From 2016 the excise rebate would incrementally decrease, so by 2020 both imports and domestic products find international price parity.

In the long term there is always a risk that the imported product may be cheaper if a producing nation should choose to "dump" biofuels on the world market. However, part of the Page Research Centre's implementation plan is the development of a sustainability standard. Such a standard could specify that domestic and imported biofuels also meet World Trade Organisation agreements. By 2020 it is essential that Federal Government take action against overseas subsidised biofuels to ensure an international parity price is not artificially driven.

- Development of a sustainability standard

Both domestic and imported biofuels must meet a sustainability standard which includes the provision that fuels can not be from staple food sources. Sustainability standards for biofuels are being developed in a number of European countries and Brazil. Such standards can ensure that biofuels are produced from non-food groups and without destruction to natural habitats. The NSW Government has already developed a biofuels sustainability standard which recognises a range of environmental and human rights issues. Particularly, the sustainability standard in the biofuels aims to ensure the production and purchase of biofuels does not impair food security.

For example:

Biofuel production shall minimize negative impacts on food security by giving particular preference to waste and residues as input (once economically viable), to degraded/marginal/underutilized lands as sources, and to yield improvements that maintain existing food supplies.⁷

A sustainability standard could also encourage future development of advanced generation biofuels. Providing sustainability benchmarks encouraging new technologies and raw materials will further assist the industry to develop.

- The Costs to Retail Fuel Providers

The Page Centre acknowledges that some retail providers may face the costs of updating tanks. The Centre is particularly concerned that it will be some small independent rural and remote retailers that may find the transition costs prohibitive. The Centre understands that petroleum storage tanks at retail outlets manufactured after 1981 are compatible with a 10 percent ethanol blend but there will need to be some that require new lining to prevent leaks.⁸ The Page Research Centre recommends Government loans to help those viable businesses install the necessary equipment to supply biofuels to the consumer.

- From 2015 further targets are implemented to reach 85 percent ethanol blend and an increased biodiesel blend.

In some respects car manufacturers are ahead of fuel suppliers, in manufacturing vehicles able to use a range of ethanol blended fuels. In 2010, Holden is planning to launch its E85 flex fuel vehicle able to run on blended fuel from E10 to E85. This technology has already been proven during the 2009 V8 "supercar" season when the vehicles raced using E85 blended fuel. Overseas the Indy Racing League which includes the "Indianapolis 500" has been running on 100 percent ethanol since 2007. Moves are also currently underway for introducing ethanol blends into Formula One racing. With emerging technologies adopting higher ethanol blends, it is realistic to assume that by 2020 a significant proportion of new Australian vehicles will be able to use an E85 blend. The mandated level of ethanol could be adjusted to take into account these new vehicles. Similarly, the proportion

⁷ Roundtable on sustainable Biofuels , *Global Principles and Criteria for Sustainable Biofuels Production Version Zero*,
http://www.biofuels.nsw.gov.au/data/assets/pdf_file/0003/105429/RSB_Principles_and_Criteria_v0.pdf
 date accessed 25th February 2010.

⁸VACC, Position Paper: Ethanol Blends in Petrol
<http://www.vacc.com.au/ConsumerInfo/Alternativefuels/EthanolVACCethanolPositionPaper/tabid/2040/Default.aspx> date accessed 23rd March 2010

of diesel vehicles able to use a biodiesel blend above 5 percent, is likely to increase over time and the mandate target could be adjusted accordingly, following consultation.

Conclusion

The Page Research Centre acknowledges this paper does not take account of the technical and scientific issues and it was not the Centre's aim. This paper aims at generating interest in reinvigorating the biofuels implementation process. It seeks to suggest broad policy options which balance competing interests and encourages policymakers to take the next step in improving the environment. It has identified that a main inhibitor for a national implementation of biofuels has been a division within the industry which appears uncompromising. Given such a situation, Federal Government is required to mandate and lead the implementation of biofuels into mainstream use.

The Page Centre welcomes comment and further debate. Further comment can be made by emailing The Biofuels Research Taskforce info@page.org.au

Appendix 1.

ETHANOL IMPORT PRICE CALCULATION

Ethanol price FOB Brazil (Petroleum Argus 24/3/10)	650 US\$/m ³
Freight	120 US\$/m ³
Landed price	770 US\$/m ³
Convert to A cpl at 0.91US\$/AU\$	84 Acpl
Plus 5% import duty (applies to non-FTA countries)	4 Acpl
Plus terminal storage	5 Acpl
Terminal gate price excl GST	93 Acpl
Plus excise	38 Acpl
Total price excl GST	131 Acpl

Prices are impacted by approximately 6cpl with each 10 cent movement in the exchange rate, and 0cpl with each \$US10 movement in the Singapore price. Data: Caltex calculations based on published AIP data

BIODIESEL IMPORT PRICE CALCULATION

Biodiesel price FOB US Gulf (Petroleum Argus 24/3/10)	1005 US\$/t
Freight	120 US\$/t
Landed price	1125 US\$/t
Convert to A cpl at 0.91US\$/AU\$	109 Acpl
Plus 5% import duty (applies to non-FTA countries)	5 Acpl
Plus terminal storage	5 Acpl
Terminal gate price excl GST	119 Acpl
Plus excise	38 Acpl
Less Cleaner Fuels Grant	38 Acpl
Total price excl GST	119 Acpl

Prices are impacted by approximately 6cpl with each 10 cent movement in the exchange rate, and 8cpl with each \$US10 movement in the Singapore price. Data: Caltex calculations based on published AIP data

Appendix 2.

IMPORTS \$US	B100	B99	E100	Comment
\$US/t	1004.64			FOB US Gulf from Argus. Up until 31/12/2009 the price was reduced by the US Blenders' Grant of \$US1 per gallon - there is uncertainty whether it will be restored.
\$US/L	0.88			1136L/t
\$US/M3			750	World price for ethanol, known as FOB Santos Brazil from Argus.
\$US/L			0.75	
Shipping \$US/L	0.11		0.11	\$US120/t
\$US SUBTOTAL	0.99		0.75	
Uscpl	99.44		75.00	

IMPORTS \$A	B100		E100	Comment
Acpl	109.27		84.67	\$US1=\$AU0.91 CBA exchange rate 24/03/10
Tariff	0		0	
Terminalling	2		2	
Freight (to Newcastle)	2.5			
Net excise	0		38.143	\$US120/t
Acpl TOTAL	113.77		124.81	

LOCAL	B100		E100	Comment
Acpl	100		85	Average Australian prices