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17 February 2006

The Committee Secretary
Senate Rural and Regional Affairs and Transport References Committee
SG.62
Parliament House
CANBERRA ACT 2600

Dear Ms Le Guen

Re: Ethanol submission for Senate Committee

Australian Cane Growers Council, which represents over 85% of sugarcane growers in Australia, supports the development of fuel ethanol as a diversified source of income for Australian sugarcane growers.

CANEGROWERS continually surveys the economic and technical aspects of production of ethanol. Its current observations are contained in the attached submission.

We trust that this information is of value to the Senate Committee.

Yours sincerely

Ian J Ballantyne
GENERAL MANAGER

AUSTRALIAN CANE GROWERS COUNCIL

Submission to the Australian Senate – Rural and Regional Affairs and Transport References Committee

Fuel Ethanol in Australia

Ethanol Use in Fuel

This submission reviews the situation in relation to ethanol use in fuels in Australia. It examines Australia's position within world ethanol markets, sources of fuel ethanol, costs of production and markets for ethanol fuel and the impact on Australia of a large fuel ethanol industry.

The production of ethanol for fuel from biomass is not a new concept. Ethanol has been used in fuel since the start of the development of automobiles; Henry Ford produced his model T vehicles with the expectation that the main fuel would be ethanol. Ethanol was, by law, added to fuel in Queensland between 1927 and the mid 1950s; it was produced in significant quantities during World War II to supplement imported fuel. The oil price shocks in the 1970s and 1980s lead to a renewal of interest in ethanol for fuel and to proposals, since discredited, for on-farm fuel ethanol production. Support for ethanol to be used in fuel has been developing, particularly within the sugar and grains industry, for most of this decade. Some see this as having the potential to "save" the sugar industry, others as a way of reducing greenhouse gas emissions or urban air quality problems. At the same time, uniquely in Australia, a majority of vehicle owners are resistant to the inclusion of ethanol in their petrol, many believing that it could damage their vehicles.

Ethanol Programs Overseas

Brazil

Brazil is the largest user of fuel ethanol in the world and has the oldest fuel ethanol program currently in use. Since 1975 there has been a mandate in place requiring ethanol to be blended with gasoline in proportions ranging between 22% and 26%. In the 1980s, most new vehicles ran on straight ethanol, but supply problems in the early 90s reduced the popularity of such vehicles. In recent years the introduction of "flexi fuel" vehicles that can operate at any percentage of ethanol between straight ethanol has been a huge success, now capturing over 70% of new vehicle sales. This has lead to an upturn in demand for ethanol; in the first years of this decade demand was trending downwards or was flat but it is now rising again. Brazil currently produces approximately 16.5 GL (gigalitres – a thousand million litres of ethanol), which is approximately equal to Australia's gasoline demand of 18.5 GL. Fuel ethanol represents 41% of Brazil's total gasoline demand.

Other Countries

The second largest ethanol industry in the world is in the USA, where 13.2 GL of ethanol is produced; this represents 2.6% of gasoline demand in that country. In the USA, most ethanol is produced from maize. The US government is committed to considerable expansion of renewable sources of energy, which are expected to make up 7% of total energy consumption by 2025. Ethanol use in the USA is encouraged by a patchwork of incentives at federal, state and local level. Some areas mandate levels of oxygenate in the fuel, credits and tax exemptions are provided and mandated use of biofuels is being projected both at state and national level; a mandate for ethanol use is applied in Missouri. Ethanol production consumes approximately 13% of the corn produced in the USA and represents the highest growth rate amongst corn users. Most product supplied is E10 (a 10% blend of ethanol in petrol) but flexi fuel vehicles have appeared and some E85 is available. Total US ethanol production capacity is estimated at 14.4 GL and this is rising 30% per year; increased demand will see all this capacity utilised this year. Most distilleries are owned by farmers' cooperatives.

A number of other countries support fuel ethanol use; the current status of measures to support ethanol in a number of countries is summarised in Table 1.

Table 1. Fuel Ethanol Programs – Current Situation and Government Intentions

COUNTRY	EtOH PRODUCTION	CURRENT GOVERNMENT POLICIES PROMOTING BIOFUELS
Colombia	800 ML (2006)	Intention to direct all sugar currently being exported at world market price to EtOH.
Thailand	116ML	E10 used for all higher-octane fuels from 2006. Government considering general mandate.
Japan	117 ML	E3 set as standard. Government considering mandating by 2012. Would require 1.8 GL
China	3.6 GL	E 10 mandates in 5 test cities. To be extended to 8 provinces in the NE and E parts of the country in Dec 2005.
EU		The EU biofuels directive promotes use of biofuels, requiring member states to set "indicative targets" for 2005 and 2010. Reference values are 2% by end 2005 and 5.75% by end 2010 (based on energy content). Member states are free to set their own targets but "should justify any differentiation between the proposed national targets and the directives reference value" in annual reports.
France		Biofuels target 2005 1.2%, 2010 5.75%. "Agréments" (accreditations) for tax-exempt production of bio-ethanol will total 400Ml by 2007.
Sweden	98 ML	Current consumption 1%. Target of 3% biofuels by end of 2005. Tax exemption for biofuels for equivalent to AUD $1/Lt. This incentive not seen as sufficient to reach the 2010 target of 5.75% so a "biofuels certificate system" is being considered. Alternate fuel vehicles receive free parking and exemption from inner city congestion charges.
India	1.7 GL	Indian government put in place a mandatory blending of E5 in 9 sugar-producing states. This mandate was rescinded in November 2004 because of a lack of ethanol. Plans were announced for this to be increased to 10% ethanol by 2010, which would have used 3.3GL. These plans have now been shelved.
Canada	250 ML	Planed production of 1.4Gl by 2010. Expect that cellulose-based will be the prominent source of future biofuels. Lignocellulose to ethanol pilot scale plant currently in operation.

Perhaps not surprisingly, the USA and EU have put in place prohibitive tariff walls to shield their ethanol producers from competition.

Current Situation in Australia

Australia currently uses approximately 18 GL of petrol a year; a mandatory E10 blend would therefore consume approximately 1.8 GL. At present, ethanol capacity in Australia is approximately 180 ML. Ethanol in Australia is currently produced from either molasses (the residue that remains from sugarcane juice when all available sugar has been extracted) or starch produced as a by-product of wheat separation at the Manildra ethanol facility in NSW. Other possible feedstocks are grain (mainly wheat or sorghum) or low-grade sugar streams in a sugar factory (as is used in Brazil). Other crops have been considered for ethanol production; an RIRDC study looked at the possibility of ethanol production from sugar beet in Tasmania and sweet sorghum has been investigated in Far North Queensland.

The Australian public has a poor perception of ethanol as an additive in fuel. This is mainly the result of media and political concentration on alleged ethanol-related vehicle damage in early 2003. Surveys reveal that 35 % of the population are "unhappy to buy" E10 and a further 21 % "have doubts about buying". Interestingly, despite the wide media coverage, no actual examples of vehicles damaged by ethanol have ever been documented, even though ethanol concentrations in some petrol sold was just below 30%.

Australian Governments have enacted different measures to encourage the use of biofuels. The Federal Government, in 2001, adopted a target for biofuels to contribute at least 350 ML to the total fuel supplied by 2010 (350 ML represents approximately 2% of petrol use or 1% of combined petrol and diesel). It has also put in place an excise and tariff regime to protect domestic ethanol producers. At present, both domestic and imported ethanol incur the same excise as petrol (currently 38.143 ¢/L) but domestic producers receive a rebate equal to this amount. As from 2011, this rebate will cease but a grant will be provided under the Cleaner Fuels Grant Scheme for both domestic and imported ethanol; effectively this will be equal to an excise of 2.5 ¢/L which will rise progressively to 12.5 ¢/L by 2015. From 2011, therefore, domestic fuel ethanol producers will have to compete with imports, probably from Brazil.

The Federal Government has adopted a standard of E10 as the maximum ethanol content that can be used in petrol in Australia. It has put in place a requirement for labelling of petrol pumps that supply ethanol blends.

The Queensland Government has initiated a major program to promote ethanol use and it recently released a *"Queensland Ethanol Industry Action Plan 2005-2007"*. Funds have been allocated in the current budget for expenditure on measures to boost consumer confidence in the safety of E10, encourage investment, assist petroleum retailers to provide E10 tankage, encourage downstream processing of ethanol for value adding and encourage market expansion, for instance into diesel/ethanol blends. The Queensland Government is also calling for a national 10% mandate for the use of ethanol.

Supply and competitiveness of fuel ethanol

In order to estimate the potential role that the sugar industry would play in an ethanol industry, it is necessary to make estimates of the cost and volume of potential suppliers of fuel ethanol in Australia:

- **Existing fuel ethanol capacity**: Estimated at approximately 150 ML, made up of Manildra (100ML), two thirds of the 70 ML capacity of CSR Ltd's Sarina plant and 5 ML from the small ethanol plant at Rocky Point sugar mill. Production costs are estimated at around 60 ¢/L, depending on molasses costs.

- **Ethanol from grains:** A number of projects for ethanol production from grain are in the planning stage. For the purpose of this analysis, estimated capacity is four 60 ML facilities for a total of 240 ML. The grain demand for these would amount to approximately 30% of Australia's current sorghum crop or around 3% of the current wheat crop.

  Although feedstock costs per unit of ethanol are higher for grain than for other uses, ethanol production from grain also involves the production of a by-product, distillers dry grain (DDG) at 32% of dry weight of the input of grain, which will produce income for a grain ethanol factory. Net production costs for ethanol from grain are estimated at 65 ¢/L

- **Ethanol production from molasses:** The Australian sugar industry produces around 1.1 Mt of molasses annually. Of this, around 260 kt is used in the Sarina facility, leaving around 820 kt for alternative uses. It is assumed that 50% of this would be diverted into fuel ethanol with potential production of around 110 ML. Production cost is estimated at around 70 ¢/L; this includes an allowance for dealing with dunder, a by-product that can potentially have significant negative environmental effects, but which can be beneficiated to act as a valuable fertiliser.

- **Ethanol potential from low-grade sugar streams:** Low-grade sugar streams are those in a sugar mill that could most easily be exploited to produce ethanol; their diversion from the current process could reduce costs and improve sugar quality. These streams comprise around 20% of the total sugar production. It is estimated that this source could produce 630 ML of ethanol per year at a cost of production between 75¢/L and 80¢/L, including cost of dunder disposal.

These figures are indicative only; actual costs and production levels will depend on individual plant costs and investment decisions, which will vary from case to case. Nonetheless, these estimates do allow an indicative supply curve for ethanol to be established. This is shown on Figure 1.

Figure 1 Ethanol supply curve

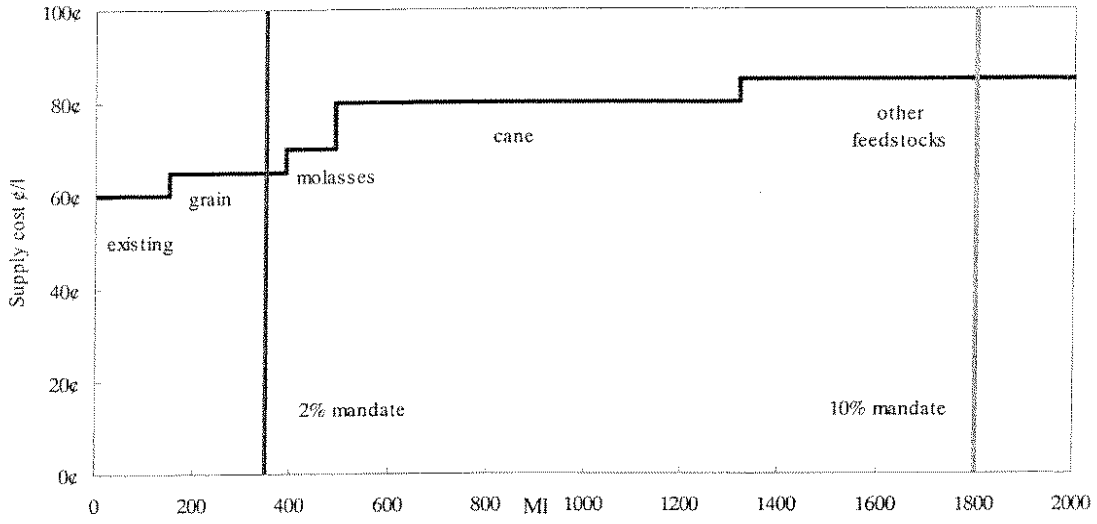

Figure 1 shows that ethanol production potential from grains and molasses, at 490 ML, would easily supply the ethanol required for a 2% mandate (equivalent to the MRET target), equalling approximately 2.7% of supply. On the other hand, a 10% target would require all the above feedstocks plus others; these may come from additional diversion of grain or from higher value sugar streams.

In the absence of a mandate, fuel ethanol has to compete with petrol in the market place. The Federal Government has put in place an excise regime to cover ethanol and petrol within which, superficially, it may be claimed that ethanol can be competitive against these products.

Figure 2 shows the ethanol supply curve compared with petrol with current excise and petrol prices in place. In preparing this graph, it has been assumed that ethanol can be sold at the same price as petrol per litre. The energy density of ethanol is approximately 70% that of petrol and various analysts have suggested that therefore the price of ethanol should be discounted, which would mean that E10 should sell for 3¢ less than unleaded petrol (ULP). However, E10 blends currently on sale in Australia are priced competitively with ULP; this indicates that the ultimate purchaser is indifferent to the slight, theoretical reduction in efficiency that may result from E10 use. This is the experience in other countries as well.

Figure 2 Ethanol supply curve compared with petrol - current excise and prices

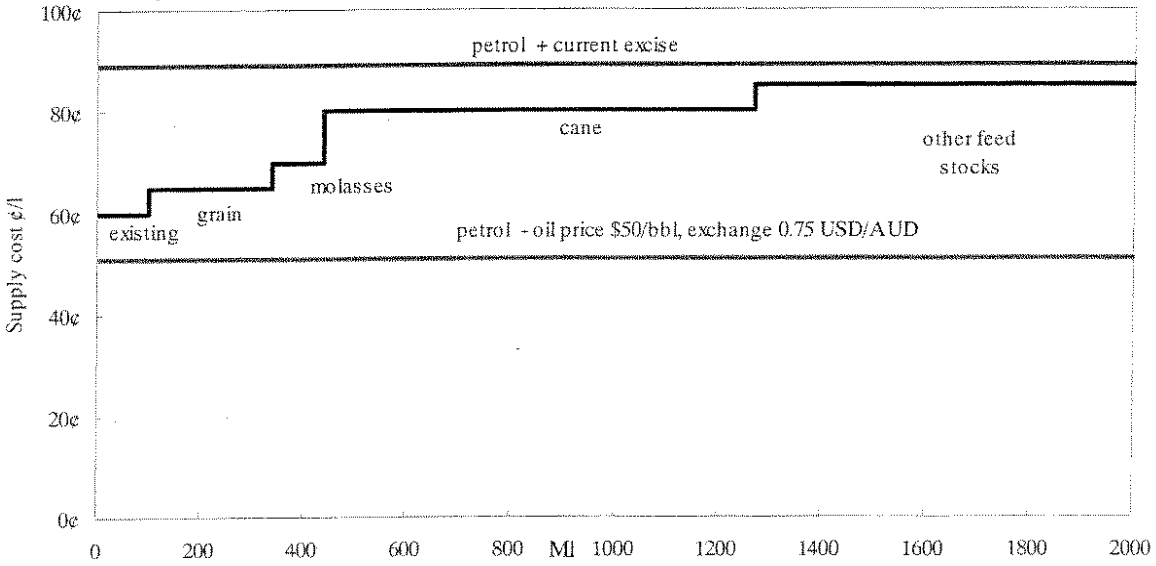

Figure 2 shows that at an oil price of USD50/bbl and an exchange rate of USD 0.75/AUD, ethanol would be competitive with petrol. This might imply that no mandate is required for the establishment of an ethanol industry.

However, the ethanol supply curve with the current excise and an assumed long-run petrol price gives a different picture. This is shown in Figure 3.

Figure 3 Ethanol supply curve compared with petrol - current excise long run price

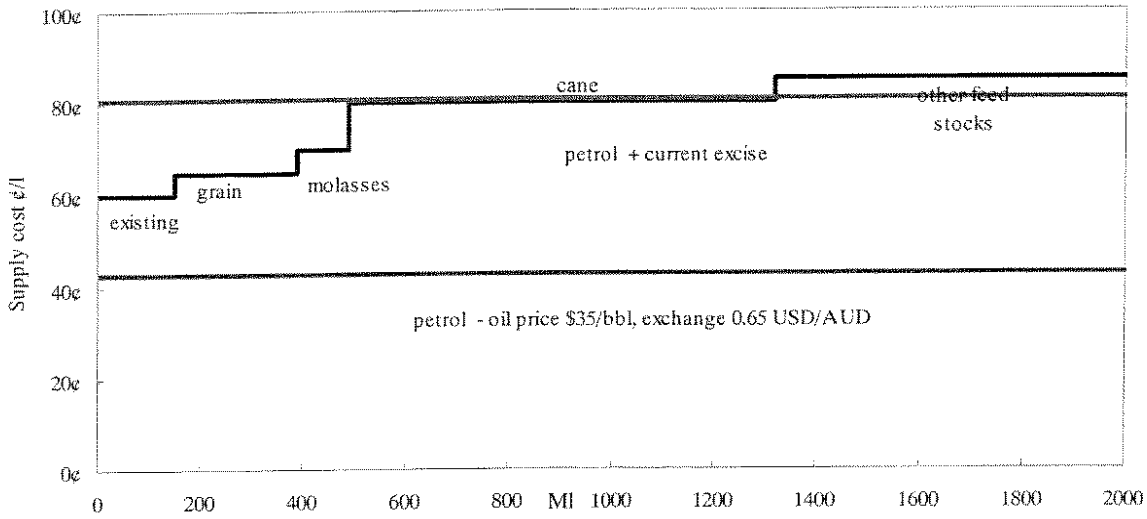

Figure 3 shows that, at an assumed long-run oil price of $35/barrel (as assumed by ABARE) and an assumed long-run exchange rate of US65 ¢/AUD, the current excise regime may provide opportunities for ethanol production from grains and molasses but would make such production from cane or sugar streams marginal.

With the changes to excise on ethanol that will come into effect in 2011 and be fully effective in 2015, ethanol will face its own set of excise costs. This is shown in Figure 4, which uses an effective excise of 8.75 ¢/L, this being the average excise that would apply, under current policies, for a plant built in 2007 with a 25 year life.

Figure 4 Ethanol supply curve compared with petrol - long run price and excise

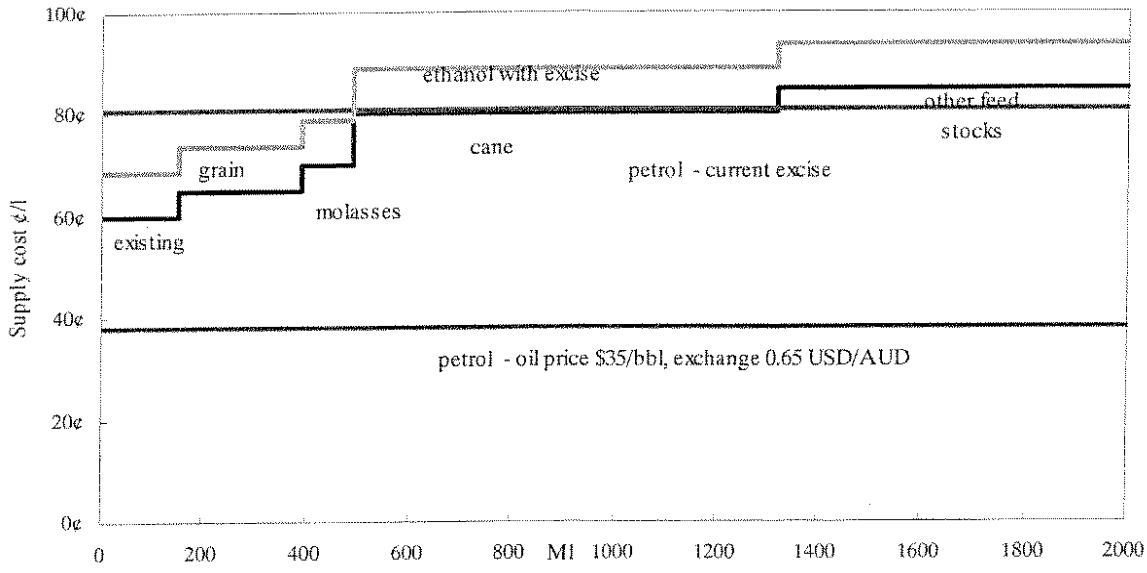

Figure 4 demonstrates that the long-run projections are for a reasonable competitive position for ethanol from grain or molasses and very little likelihood that ethanol from

cane would be economic. However, capital investment in ethanol capacity under the current excise regime is likely to be difficult because of the fact that, from 2011, domestic ethanol producers will have to compete on equal terms with imports. It is estimated that import costs may be less than around 75 ¢/L, which could be competitive with ethanol production from molasses.

Impacts on Australia of a fuel ethanol industry

Establishment of a fuel ethanol industry would have four significant benefits: environmental, benefits to human health, increased regional employment and improved fuel security.

Environment and health benefits

Because ethanol is a renewable fuel, its combustion does not add carbon to the atmosphere. However, there is significant debate about other effects of production of ethanol on greenhouse gases. A much-criticised CSIRO study in 2000 for the Australian Greenhouse Office indicated that there is little net gain in greenhouse emissions in switching from petrol to ethanol use. However, a subsequent review commissioned by CSR showed that the net gain may be up to 50%; Brazilian studies show a ratio of 8:1 of energy input to output in ethanol production.

The issue of ethanol benefits in terms of air quality and air toxics is also a complicated one. Ethanol has the ability to reduce pollutants, particularly in older vehicles. However, an E10 blend may release more hydrocarbons to the atmosphere than petrol, although these can be controlled with proper tankage arrangements. While theoretical objections to ethanol's environment and health benefits can be made, practical experience of adding ethanol to fuel has produced significantly positive outcomes.

Regional employment and fuel security

An ethanol industry, adding to the range of the value adding opportunities for crops such as grains and sugar, would strengthen regional economies and provide additional employment. Each plant could create around 30 permanent new jobs and generate investment spending of around $80 million and operational spending of around $20 million a year.

At the same time, ethanol extends the supply of petrol and displaces imported oil, potentially benefiting Australia's balance of payments situation and improving fuel security.

Effects on other industries

The production of 240 ML of ethanol from grain would require approximately 600 kt of grains. This represents around 30% of Australia's total sorghum production or around 3% of Australia's wheat production. As noted, the production of ethanol from grains results in a by-product; distillers dry grain (DDG) at 32% of dry weight of the input of grain. This has three times the protein level of the initial grain and higher energy content and so represents a superior feed. 600 kt of grain would produce 90Kt of DDG.

Production of 110 ML of ethanol from molasses would potentially soak up most molasses sales in Australia that are not already destined for export.

Conclusion

There are no technical or environmental obstacles to the introduction of a significant fuel ethanol industry in Australia and a number of significant environmental and social benefits. However, further adoption of fuel ethanol will require a change in consumer perception of this fuel; uniquely, the majority of Australians believe its use will damage their cars. At current oil prices, fuel ethanol from a variety of sources would be economic, but at projected prices the establishment of a fuel ethanol industry of more than about 3% of national petrol use would require a mandate. Even if a mandate were in place, imported ethanol from Brazil would be competitive with some domestic production. Fuel ethanol production from grain or molasses may have an effect on availability of these products for feed, but in the case of grain in particular, another product (DDG) will become available.