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State Development, Infrastructure and Industry Committee

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### **Liquid Fuel Supply (Ethanol) Amendment Bill 2014**

Thank you for the opportunity to comment on the Liquid Fuel Supply (Ethanol) Amendment Bill 2014. Capricorn Conservation Council has since 1973 been the principal non-government environmental organisation in Central Queensland, covering the Fitzroy Basin, plus the coastal and marine areas from St Lawrence to Baffle Creek.

#### Summary comments regarding **Purpose of Bill**

- Amend the Liquid Fuel Supply Act 1984, specifically to require minimum ethanol content in relation to the total volume of motor spirit sales in Queensland.

A mandated requirement for ethanol content would be an inappropriate market distortion as it fails to consider economic forces on food and fibre products, varying availability of such products due to climatic conditions, competing markets, and full product life cycle analysis including comparative environment 'footprint' of expanding or converting limited suitable farmland for ethanol. These factors have caused a failure or policy revision of similar mandates in Australia (NSW) and USA. Increasing ethanol production from sugar cane would:

- encourage expansion of cultivation into more marginal soils
- increase the requirement for fertilisers (often manufactured from fossil fuel sources)
- require more irrigation (already becoming uneconomic due to rising electricity prices)
- add further pressure to rivers, streams and the water quality of the Great Barrier Reef

Alternative sources of ethanol (e.g., grains, ligno-cellulose, *Agave*) have yet to be demonstrated to be a substantial and reliable source. Conversion of sucrose from existing sugar cane production from use in processed foods to power ethanol might have a positive social and economic outcome, but this should be left to the commercial realities of the market rather than be subsidised via a mandatory ethanol content law.

- Allow the required percentage and relevant periods to be determined by Regulation if required.

Regulations and reporting in other jurisdictions have been ineffective. National and international markets for food and seasonal supply and demand factors have meant that NSW fuel suppliers cannot consistently meet mandatory requirements due to the fluctuation in ethanol production caused by feedstock supply variability. Having a constantly varying 'required percentage' of ethanol content will simply add an inconsistent variable into the market. This can have negative environmental consequences as more land is converted away from food to ethanol production, and later abandoned, when the markets shift or regulations change.

- Stimulate the orderly development of, and investment in, a fuel ethanol industry in Queensland.

Biofuels have a future in the mix of energy alternatives but global market trends, research and development of sustainable energy sources; indicate that study is needed into the environmental, social, and economics impacts rather than applying a market distorting mandatory content rule.

- Stimulate regional and rural development through the creation of an alternative and stable market for feed stock produced in Queensland and the creation of new jobs in the fuel ethanol industry.

This aim is commendable, though has to be considered in the light of the withdrawal of government support for research and development (CSIRO funding cuts have led to an abandonment of their aviation fuel study in Central Queensland). Stimulation of alternative energy sources especially for regional and rural Queensland should include the full range of potential sustainable energy sources and not simply focus on ethanol production.

- Improve the quality of unleaded petrol and reduce greenhouse gas emissions from motor vehicles in Queensland by blending a minimum quantity of the oxygenate, ethanol, with unleaded petrol used in Queensland.

Reducing greenhouse gas emissions from motor vehicles is a perfectly sensible aim. Replacing petroleum based fuel with ethanol needs to have a total lifecycle analysis, including carbon budget and other environmental assessments conducted. This should include an assessment of alternatives like improving public transport, increasing railway capacity (e.g., longer passing loops can double the train traffic, reduce road use and would have a lower GHG footprint than subsidised, energy and water hungry biofuel crops.

- Reduce Queensland's reliance on foreign oil imports and Queensland motorists' exposure to the vagaries of the global oil market.

Global trends suggest that a combination of improved urban design, increased use of public transport, vast improvements in engine efficiency, especially the rapidly declining costs of electric vehicles powered by sustainable energy sources, battery technology and tele-commuting all indicate an impending revolution in transport energy opportunities. Queensland should be leading this revolution rather than applying archaic economic methods like mandatory ethanol content rules.

- Take advantage of the emerging second generation technology producing ethanol from lignocellulosic biomass (such as wood residues, municipal paper waste, grain sorghum, agricultural residues and dedicated energy crops), eliminating the need to use traditional food crops and creating a renewable, clean and green liquid fuel alternative to fossil fuels•

Investment in new energy technologies is applauded especially when materials currently considered to be waste are treated as resources. Caution must be applied before exploitation of agricultural by-products which may currently be used as 'trash blankets' which reduce run-off and fertiliser use, or forest by-products which come from unsustainable plantations or native forests or grains which have competing demands (food) and variable supply (seasonal, climatic, water security, soil depletion;– refer to ABARE and CSIRO studies which show high vulnerability of our food producing capacity from global warming as CO<sub>2</sub> continues to rise from 400ppm towards 500ppm). 'Clean and green' liquid fuels need to be able to fully demonstrate they are truly sustainable and cause no loss of biodiversity before they can be used as a justification for mandating ethanol in vehicles.

- It is expected that there will be minimal extra cost to Government.

This expectation needs greater scrutiny and justification. A mandatory content without administrative oversight will be tokenistic, even if all the other matters raised above can be demonstrated as environmentally and economic responsible. Our energy future needs multi-lateral support and investment from governments, industry communities and individuals who are often the ones taking a lead in energy self-sufficiency. A thorough independent analysis should be done into the hidden costs and 'negative externalities' of the crude regulatory mechanism of the proposed mandatory ethanol content Bill.

- 35AG Exemptions from ss 35AE and 35AF Section 35AE forms the remainder of the provision that allows motor spirit producers and refiners not to comply with the mandate provided for in Sections 35AE(2) and 35AF(2). Motor spirit producers, refiners and sellers can only avoid complying if the Minister grants them an exemption under section 52 and then only if the Minister is satisfied that an applicant for exemption cannot secure sufficient quantities of ethanol, at a prescribed price, to satisfy the requirement

Such exemptions nullify the mandatory requirement rendering the Bill unnecessary.

This bill does not realise that the potential production of ethanol in Queensland is minute compared to the potential production in areas such as the southern USA where there is a vast surplus of private and public plantation pine due to 30 years of over production and a decline in demand for sawlogs and round timbers. These are all reasons why the potentially massive USA biofuel industry (other than adding woodchip to coal burning power stations) is still experimental and going nowhere fast. The massive collapse of the Range Fuels bio-liquid project in Georgia (see references) has let in a New Zealand company who bought the lot at a bargain basement price.

There are 214 million acres of productive natural and plantation pine in the USA which could produce 4 to 10 (imperial) tons (not tonnes) of dry matter per acre over an area 2 to 5 times larger than the entire Brigalow belt and northern grazing lands of Qld. The already mass cleared Brigalow is now a threatened ecosystem and could never be highly productive. CSIRO have abandoned its research program into potential aviation gas production in CQ.

The attached conclusion of the US forestry consortium on the potential benefits and difficulties of achieving a sustainability industry showed the following problems:

- •Massive water requirement (and the SE USA states probably have more water availability than the whole of Australia)
- •Changing land use eg private forest owners opting in and out
- •Loss of wetlands and biodiversity.
- •Competition with more valuable wood products when the timber industry catches up with surplus.

Minor and dispersed biofuel processing of waste products may have potential for a very small output of biofuels. Ethanol 2<sup>nd</sup> generation from lingo-cellulose like biodiesel from algae is still in the research and development stage and has yet to demonstrate environmental sustainability<sup>1</sup>. Similarly bio-fuel from *Callophyllum*, cassava, *Agave*, *Pongamia* may become small scale supplements to energy sources.

Brigalow regrowth or grassland harvesting impacts on biodiversity and ecological connectivity of regional ecosystems would be at risk as would the expansion of ethanol crops and eventually cause negative impacts on Great Barrier Reef water quality.

The cost benefits, massive water demands, increased pesticide, fertiliser use, biodiversity pressures of alternatives sources of biomass for ethanol production, e.g., *Agave* plantations, would have to be assessed for the risk from land use changes, soil impacts, harvesting, transport and processing energy demands before rushing in a form of subsidy to the sugar industry.

Ethanol from *Agave* has a positive bioenergy rating, but the plant has the potential as an invasive weed (from previous garden escapee and failed sisal hemp plantations) and is vulnerable to botrytis infestation when plants are grown under continuous extremely high humidity<sup>2</sup>. Thus while there may be areas of Queensland with suitable soils where *Agave* does not replace existing food producing land or natural habitats, and which is not subject to infestation of rabbits, a prolific consumer of young plants, these areas are in the central and far western. This means that production and transport costs will be higher, as will fuel use (currently fossil fuel based), reducing the **Energy in / Energy out** balance. ( $E^1 / E^0$ ).

Diverting sucrose from existing sugar cane production areas from use as a processed food additive to ethanol for energy would have human health (and therefore economic benefits). However sugar cane productivity is highly susceptible to global markets, increasing climatic variability, available land and depleting soils, (in addition to the on-going petro-chemical based fertiliser use and subsequent discharge of excessive nutrients into rivers and the Great Barrier Reef lagoon).

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<sup>1</sup> Diesendorf, M., Sustainable Energy Solutions, UNSW Press, 2014

<sup>2</sup> Feasibility of *Agave* as a Feedstock for Biofuel Production in Australia RIRDC Publication No. 10/104

Caution would have to apply to any encouragement mass cropping of *Agave* or other ethanol producing crops, In the case of *Agave* it's high fructose content could, though market forces be diverted to processed food and emulate the situation with the conversion of 'whole food' producing lands in the USA to broad scale corn for syrup sweeteners, which has been a blamed as a factor in to the so called obesity epidemic. Would strict industry controls be applied to quarantine sugars intended for bio-fuel production from more profitable markets? A mandatory ethanol content rule with exemptions would not likely be an effective control measure.

Subsidised plantations of hardwood forests have a very patchy history in Queensland. Many cloned varieties have failed to mature and plantations have often been in totally inappropriate localities (e.g. Greenlakes, CQ where dryland hardwoods were planted in a wetland soils and 'drowned'. The research and monitoring requirement of such schemes is huge and therefore very costly to proponents and government agencies alike. A mandated ethanol requirement would encourage such environmentally hazardous and economically foolish practices.

Climate Change predictions for Central Queensland<sup>3</sup> presented by DPI (2009) showed progressive Australian mean temperature increase of 0.9°C and between 5 and 50mm annual rainfall since 1950, Predictions for Central Queensland showed an upward trend in days over 35°C predictions of 2°C mean temperature, 7-12mm mean rainfall reduction and corresponding 6-7% increased rate of evaporation. Adaptive capacity & vulnerability of different sectors indicated that Queensland's natural Systems, water security coastal communities and Agriculture & Forestry as having the highest vulnerability and lowest adaptive capacity of all our social and economic systems. A mandated ethanol content rule not only ignores these increasing pressures on water, food and soil security, and biodiversity, but adds further stress to these systems to promote an old technology becoming progressively obsolete and for which there are rapidly emerging alternatives.<sup>4</sup>

Rather than ongoing support for the last centuries' oil consuming combustion engine, investment should be in:

- Urban planning
- Public transport improvements
- Sustainable energy systems
- Improved freight transport systems e.g., longer passing loops on railways to double or more the carrying capacity – powered, of course, from sustainable energy

CSIRO had been studying the potential use of regrowth and grasses for lignocelluloses biomass to: 'supply sufficient to support production of 470 ML/yr of Jet A could be established in central Queensland; with a feasible industry scale-up over 25 years' though acknowledged risks to food security and biodiversity.

Work was still required to re-measuring existing tree trials, establishing new field experiments to better understand biomass production in relation to management inputs/variables, assess the sustainability of both biomass production and environmental values, study supply chain logistics, collect key economic data, further refine of estate establishment/management/processing and scale-up strategies including a full Life Cycle Analysis, carbon abatement curves, assessment of impacts on soil, water and biodiversity, and regional socio-economics. Funding for this program has been cut. The Queensland Government should coordinate with the Federal Government to invest in research and development of sustainable energy options rather than simplistically apply an ethanol content rule.

Yours Sincerely



Michael McCabe, Coordinator

*Attachment: References*

<sup>3</sup> A risk management framework for assessing climate change impacts, adaptation and vulnerability Cobon, D. et al.

<sup>4</sup> UNEP YEAR BOOK 2013 Emerging Issues in our Global Environment

## Attachment – References to global trends in biofuel

“Although **cellulosic ethanol can be produced in the laboratory** and at pilot scale, the genetically engineered enzymes **or heat needed to break down the plant material into sugars is expensive**. Not a single company has succeeded in scaling up commercial cellulosic ethanol production in the United States. The U.S. corn belt may have perfected the art of fermenting its crop to produce fuel alcohol, but **controversy abounds over the water use, the energy input for cultivating corn, and the limits and long-term viability of turning an edible product into fuel**.<sup>5</sup>

But **advanced biofuels have not scaled up as quickly as many have hoped**. In the United States, for example, **there are moves to repeal or scale back a mandate requiring oil refiners to blend increasing amounts of biofuel** into the U.S. transportation mix. Domestic production of cellulosic biofuel has not met the government's projections, and enthusiasm for continued ethanol subsidies is low.”<sup>6</sup>

“**Liquid biofuels require extensive supplies of water** in addition to biomass feedstocks. **This may prove an important limiting factor** regarding the development of a commercial scale bioenergy production, in the same way that water has organized and limited the distribution of pulp and paper plants.”

“**Forests provide a multitude of services beyond fibre production**. A substantial increase in harvesting or shift toward intensive management could have important implications for this natural infrastructure. **Concerns focus largely on wildlife habitat and the protection of water quality** in the region. For both, the extent of potential impacts depends on the eventual size of the sector and on the concentration of production.”<sup>7</sup>

**Biofuels are projected to grow** moderately over the projection period (**much slower than earlier assessments**) as **policy makers realize that the environmental and energy independence benefits of biofuels do not outweigh their costs**. Indeed, global production of biofuels increased little during the past 3 years<sup>8</sup>

### CSIRO

“The dominant native plant communities are woodlands of highly water stress tolerant brigalow (*Acacia harpophylla*). Much of the Brigalow Belt bioregion has been cleared for agriculture, and sixteen regional ecosystems within the Brigalow Belt are listed as threatened (endangered) ecological communities under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) [16]. On a year to year basis grass growth in the region varies with climate, especially by the amount and pattern of rainfall received; in lower rainfall years growth is greatly restricted making sourcing of biomass difficult, and there is strong competition for grass from the cattle industry. Other impediments include challenges in harvesting due to tree cover, tree fall and other physical obstacles, uneven ground and other unsuitable ground conditions. However, growth generally slows after several coppicing events, so the practice cannot be repeated indefinitely. Limitations include requirements for new mechanical harvesting equipment, the relatively low energy density of the harvested biomass, and potential competing demands for the use of wood. A total of approximately 1.1 million ha of regrowth forest was cleared on freehold land in Queensland between 1995 and 2007. Given the current legislation it seems unlikely that the annual rate of future tree clearing in Queensland would rise above the 2006-07 figures of 66,400 ha on freehold land. In addition, natural systems such as Brigalow contain primarily N-fixing species, minimising the need for N fertiliser inputs that are otherwise needed to maintain the productivity of intensively harvested SRT systems. Harvesting regrowth for biomass will however require careful consideration of environmental impacts as well as management of public perception around those impacts. Our strategy constrains biomass supply from regrowth so that it does not exceed current annual rates of clearing.

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5 LanzaTech Grabs Failed Biofuel Refinery in Georgia Pine

6 <http://environment.nationalgeographic.com/energy/great-energy-challenge/big-energy-question/are-biofuels-worth-the-investment/>

7 The South's Outlook for Sustainable Forest Bioenergy and Biofuels Production, David Wear et al.

8 [http://www.worldbank.org/content/dam/Worldbank/GEP/GEPcommodities/commodity\\_markets\\_outlook\\_2014\\_july](http://www.worldbank.org/content/dam/Worldbank/GEP/GEPcommodities/commodity_markets_outlook_2014_july)

Repeated removal of the majority of above-ground biomass will lead to significant exports of nutrients and may threaten the capacity of soils to sustain high rates of biomass production in the future. Very little research has been undertaken on the biodiversity outcomes of landscapes which integrate biomass supply for bioenergy with grazing production systems. Planting perennial crops like SRTs may improve habitat quality and connectivity on grazed lands for some species, however market forces favourable for biofuels could make some marginal and otherwise under-utilised land attractive for conversion to biofuel crops to the detriment of biodiversity overall <sup>9</sup>

Estimated (3-PG model) potential productivity of SRTs – the most productive areas for (115 t/Ha)<sup>10</sup> is mapped as the near coastal ranges. Any cropping of these areas will be detrimental to the implementation of the Queensland Biodiversity strategy which is proposing investment in regional ecosystem hubs and corridors.”

UNEP YEAR BOOK 2013 Emerging Issues in our Global Environment p.65

[http://www.unep.org/pdf/uyb\\_2013\\_new.pdf](http://www.unep.org/pdf/uyb_2013_new.pdf)

Renewable energy 2010 index (1990 = 100)	
Solar photovoltaics	137 150
Solar thermal	765
Wind	8 799
Biofuels - biogasoline and biodiesel	2 356

Biofuels represent <2% of Renewable energy 2010 index (1990 = 100)

<sup>9</sup> Biomass production for sustainable aviation fuels: a regional case study in Queensland, Murphy, H., et al.

<sup>10</sup> Evaluation - potential for biomass to produce sustainable aviation fuel: A regional case study in Qld, CSIRO 2014