



Contact:
Bioenergy Australia (Forum) Pty Ltd
ABN 14 155 856 821
Renewables Innovation Hub

BIOENERGY AUSTRALIA SUBMISSION

The policy, regulatory, taxation, administrative and funding priorities for Australian shipping

March 2019

The purpose of this submission from Bioenergy Australia is to highlight the future role of biofuels in the Australian shipping industry, in particular in terms of fuel security and environmental sustainability.

About Bioenergy Australia

Bioenergy Australia is the National Industry association, committed to accelerating Australia's bio economy.

Our mission is to foster the bioenergy sector to generate jobs, secure investment, maximise the value of local resources, minimise waste and environmental impact, and develop and promote national bioenergy expertise into international markets.

Bioenergy Australia's objectives are to:

Advocate - With our members, we anticipate and develop leading positions on issues of concern to the advancement and growth of bioenergy in Australia.

Campaign - We raise the profile of the industry within the media and broader community to achieve a greater level of understanding about bioenergy and the vital role it must play to achieve carbon neutrality by 2050.

Inform - We publish reports, webinars and articles to help our members keep ahead of industry trends and opportunities. We also manage the Biomass Producer website, an AgriFutures Australia resource showcasing Australian bioenergy projects, expertise, and identifying opportunities for primary producers.

Connect - We facilitate knowledge exchange and networking for members through task-specific meetings, our Annual Conference, and Webinars. We link investors with emerging businesses; researchers with technology developers; government with innovators. We also administer Australia's participation in IEA Bioenergy. Our Industry groups bring together specialists in specific fields.

Significant changes in international shipping regulations come into effect in 10 months' time

In January 2020, the marine industry will undergo one of its greatest changes in recent times with the limit for sulphur in fuel oil used on board ships reducing from the current 3.5% to 0.50% m/m (mass by mass) when operating outside designated emission control areas. This is as a consequence of changes to the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI that come into effect on Jan 1 2020. These regulations have seen a progressive reduction globally in emissions of SO_x, NO_x and particulate matter and the introduction of emission control areas (ECAs) to reduce emissions of those air pollutants further in designated sea areas. This will significantly reduce the amount of sulphur oxides emanating from ships and should have major health and environmental benefits for the world, particularly for populations living close to ports and coasts.

In FY 2017-18, 961.8 ML of Fuel Oil was sold in Australia¹, that's almost a million tonnes, from Jan 1st 2020 this must now be 0.5% sulphur fuel oil which is currently not available in Australia. Fortunately, marine engines are typically very flexible and will be able to burn (with some modification) other fuels such as Marine Gas Oil that meets the sulphur cap or road diesel at 10ppm Sulphur. However, there is a significant price increase as can be seen below; MGO is currently ~40% more expensive than IFO 380 (3.5% Sulphur Bunker Fuel)

Key Bunker Prices		More ▶		
	IFO380		MGO	
	\$/mt	+/-	\$/mt	+/-
Singapore	430.00	▶ 0.00	597.50	▲ 8.00

<https://shipandbunker.com/prices/apac>

When 0.5% Sulphur fuel oil is available it is anticipated to be \$200-\$400 a tonne more with oil at \$70 Bbl² or 45%-90% more. The major suppliers of marine fuels in Australia (Viva and Glencore) have said that they will sell compliant fuels from Jan 2020 but these will most likely be road diesel. If this is the case this will place a significant additional demand impact on supplies with likely knock on impacts in pricing that will impact other diesel users e.g. trucking, mining, agriculture, forestry as well as individuals who drive diesel vehicles.

Alternative fossil-based fuels such as the Liquefied Natural Gas (LNG) are being explored but these require associated specialised refuelling infrastructure and vessels and so are typically being investigated for niche point to point services such as bulk carriers and ferries. The other alternative is for vessels to have sulphur scrubbers fitted however there are concerns associated with the impacts associated with having the sulphur removed from the fuels purged into the oceans in the open loop design.

There is an alternative to these fuels and this is low sulphur fuels derived from biomass and wastes.

¹ https://www.energy.gov.au/sites/default/files/australian_petroleum_statistics_-_issue_269_december_2018.pdf

² <https://shipandbunker.com/news/world/564340-imo2020-the-brutal-facts-of-blending-the-new-05s-bunker-fuels>

The role of biofuels in the Australian shipping industry

Liquid transport biofuels produced from biomass, and wastes such as organic residues and non-recyclable plastics, have a much larger potential to combat climate change and reduce emissions over their full life cycle. As biomass is a renewable resource and contains very little or no sulphur, biofuels have the potential to deliver the greatest reduction in GHG emissions however all these alternative fuels will reduce GHG's and offer the potential to deliver an important domestically produced part of the fuel mix in the shipping sector.

In addition, alarming reports have emerged from the Federal Government that Australia's low emergency fuel reserves makes us "vulnerable" and creates a critical national security issue. Australia is languishing behind other nations in energy independence and security. However, today there exists a very real opportunity to improve the national fuel security and biofuels must be an integral player to ensure transportation can continue to prosper domestically and maintain its competitiveness globally.

A global transition towards biofuels in the shipping sector is underway, however the absence of well-directed policy has seen Australia lagging behind other major countries who are investing heavily in the production of these sustainable products. Although states like New South Wales and Queensland have introduced policy measures to support the growth of the biofuels and bio-based products sectors, a national directed policy would deliver stronger benefits across the country, including:

- Improved national fuel security;
- A significant reduction in greenhouse gas emissions;
- Jobs and investment, particularly in regional areas;
- New investment in refining infrastructure and skills; and
- Improved community health outcomes.

While there are challenges, it certainly is possible for bio and alternative low carbon intensity fuels to significantly displace traditional mineral hydrocarbons with positive economic and health outcomes In Australia.

The country, in fact, has several comparative advantages that increase its potential to develop a sustainable and competitive biofuel industry, including:

- an abundance of sunlight, flat land and strong agricultural industry with significant underutilised waste residues;
- world-class expertise in agricultural science;
- a strength in natural resources and infrastructure industry development; and
- a first world economy with rule of law and low political risk.

Biofuels for the shipping sector

As highlighted above the volumes of biofuels required to supply the shipping sector are large and this presents a fantastic opportunity for the development of a new industry in Australia that would drive local jobs and economic development.

Biodiesel, also commonly known as fatty acid methyl ester (FAME), is obtained from vegetable oil or animal fat. One of the main advantages of biodiesel is that it restores lubricity of the engine and reduces smoke, soot, and burnt diesel odour from engine exhaust, at the same time protecting against wear in fuel and injector pumps.

Renewable diesel is created by the thermal and hydro processing of renewable biomass and waste lignocellulosic feedstocks. The current renewable diesel type fuels are mainly produced from plant-based oils or products thereof e.g. used cooking oil (UCO). These fuels must meet Australian Fuel Quality Standards Acts and Regulation. Renewable diesel is considered a drop-in fuel and requires no blending with traditional diesel.

The production of renewable diesel is currently growing in Australia. As an example, thanks to \$4 million in funding provided by the Australian Renewable Energy Agency (ARENA), a new demonstration project is being built in Gladstone, aiming to turn biosolids from wastewater treatment sewage into renewable crude oil, which will be upgraded to renewable diesel. In addition, ARENA and Boral have funded a feasibility study into the conversion of hardwood sawmill residues into renewable diesel which could also potentially provide a low sulphur renewable alternative.

BioEthanol and BioMethanol can also be utilised in vessels fitted with appropriate engines such as those fitted by Wartsila to Stena's (Swedish RoRo operator) so whilst possible these aren't "Drop In" equivalents.

The highest GHG emissions reduction can be achieved by using residual or waste feedstock streams, such as agricultural residues, waste cooking oil, or municipal waste. Based on this principle, technologies are constantly under development to optimise the conversion of waste biomass into biofuels. A couple of examples are the Australian technology developer Licella and Mercurius Australia. Licella has recently formed a Joint Venture in Australia, iQ Renew, to construct an end of life waste to fuels plant in Australia that will be able to produce low sulphur fuels for the Australian shipping industry. This follows on from their announcement of collaboration with Neste, the world's leading producer of renewable diesel and UK-based chemical recycling company ReNew ELP in a development project to explore the potential of using mixed waste plastic as a raw material for fuels, chemicals, and new plastics. Mercurius Australia has teamed up with Australian company Southern Oil Refining, as well as MGC from Japan and KOLON from South Korea to further develop its REACH™ technology converting waste biomass (sugarcane bagasse, wood chips) and biogenic MSW into diesel, jet fuel and renewable chemicals and plastics. Southern Oil Refining is Australia's leading producer of recycled fuels and owner/operator of Australia's only biofuels testing refinery located at Yarwun QLD. Southern Oil have successfully refined a number of post-consumer waste feedstocks into 100 per cent drop-in diesel.

The potential contribution of biofuels to different aspects of the inquiry terms of reference

- *New investment in Australian ships and building a maritime cluster in Australia*

Despite the fact that biofuels are not yet abundantly used in the maritime sector, it is possible that based on existing biofuel technologies, marine biofuels can be designed and produced to be technically compatible with marine engines. Thus, they can be integrated in shipping vessels as drop-in fuels. Significant investments in Australian ships wouldn't therefore be required.

On the contrary, biofuels are currently bringing investment and revenue overseas and could do the same in Australia. The discussion Paper "Biofuels to bioproducts: a growth industry for Australia" recently published by Queensland University of Technology (QUT) estimates that the production of ethanol at 10 per cent of Australia's total domestic gasoline consumption would require A\$1.56 billion of investment, and create more than A\$1.1 billion of revenue per year in regional communities. Similarly, increased investments and revenue are expected with the employment of biofuels in the Australian marine industry.

- *The establishment of an efficient and commercially-oriented coastal ship licensing system and foreign crew visa system*

n/a

- *The interaction with other modes of freight transport, non-freight shipping and government shipping*

n/a

- *Maritime security, including fuel security and foreign ship and crew standards*

Bioenergy Australia invites the committee to consider biofuels as part of the solution to improve the national fuel security. Latest figures produced by the Department of Energy show stockpiles at the end of October 2018 were 27 days total petroleum products, 22 days of petrol and 17 days of diesel. With the decline in domestic refining in Australia, and the closure of 3 refineries in the last decade Australia has been left with 4 refineries in operation and the majority of fuel being imported. Australia would be exposed to catastrophic challenges should there be disruptions to the main shipping line to Australia. The production of biofuels in Australia can help diversify the sources of transportation fuels, including marine fuels, and decrease Australia's reliance on petroleum imports. In addition, the ability to produce fuels locally in Australia gives the shipping industry the ability to avoid their very significant hedging costs associated with buying fuels which are subject to exchange rate fluctuations between the Australian dollar and the US dollar. In some cases, for some shipping lines in Australia this accounts for up to 30 per cent of the cost of the fuels. Therefore, by producing those fuels locally in Australia there is a very significant opportunity to assist the maritime industry by avoiding these costs.

- *Environmental sustainability*

As part of the global decarbonisation process, the international maritime industry is looking at options to reduce its greenhouse gas emissions. LSF2020 refers to the new 'Low Sulphur Fuel' regulations, which will come into effect on 1 January 2020. These regulations are the biggest of a series of steps by the International Maritime Organisation to reduce marine pollution (MARPOL) in response to the threat of climate change. The LSF2020 emission regulations will require ships to significantly reduce

emissions on the high seas as well as in coastal areas, meaning that the whole shipping industry in Australia will strongly be affected. Within this scenario, biofuels, having very low sulphur levels and low CO₂ emissions, represent a real opportunity to meet the requirements and can therefore strongly support the Australian marine sector.

- *Workforce development and the seafarer training system*

With the current fuel volumes demanded by the merchant shipping industry, there is a strong market potential for biofuels to contribute to the workforce development in the Australian shipping industry. Biofuels are currently bringing jobs internationally. As an example, the EU bio-economy employs more than 22 million people, accounting for 9 per cent of total employment.

In terms of domestic employment, according to the discussion Paper “Biofuels to bioproducts: a growth industry for Australia” recently published by Queensland University of Technology (QUT), the production of ethanol at 10 per cent of Australia’s total domestic gasoline consumption would create 2080 direct jobs and up to 6570 indirect jobs. Although these projections are restricted to the ethanol market, it is expected that similar results in terms of employment opportunities could be achieved with the involvement of biofuels in the marine sector.

- *Port infrastructure, port services and port fees and charges*

The advantage of producing a marine fuel is that the fuel can be of a lower quality, have higher viscosity, and be less refined than fuels used for aviation or road transport. Thus, marine biofuels may be produced with lower processing costs, eliminating the need for secondary refining.

The established shipping operational procedures make customizing marine engines to run on new compatible fuels a costly process. Thus, it is practical to take advantage of the existing infrastructure (marine engines, fuel transport pipelines, bunkering) and produce a fuel compatible with what is already in place. Such drop-in fuels fit existing infrastructure and do not require a high investment in ship engine or infrastructure changes.

Several companies and research institutes are working worldwide on both the production of marine biofuels, and testing of their compatibility with current infrastructure, of which the US Navy has been a major player. As an initiative of the US Federal government, the US Navy developed a scheme to establish the Great Green Fleet in 2016. The program was created to provide the Navy half of its fuel and power from clean, fossil-alternative sources by 2020, with biofuels having a significant portion of the alternative fuel mix in addition to solar, wind, and nuclear energy. The production technologies for marine biofuels have been commercialized for feedstocks from plant oils, and animal fats. With minor retrofitting, the infrastructure required for refining these lipid feedstocks are already in place, and the production facilities are technically simple compared with other feedstock types.

That said, although biofuels could drop in to the existing infrastructures without significant upgrades, they would still face a significant challenge to get access to port infrastructures, because these are typically owned by oil companies, which have a vested interest in not allowing other fuels from other sources coming in. Ensuring some form of open access arrangement to that infrastructures would therefore be very helpful to help get the product to market.

Thank you for the opportunity to provide this submission.

Yours sincerely

Shahana Mckenzie, CEO Bioenergy Australia