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Department of the Prime Minister and Cabinet  
PO Box 6500  
CANBERRA ACT 2600

By Email: [Agricultural.Competitiveness@pmc.gov.au](mailto:Agricultural.Competitiveness@pmc.gov.au)

Dear Agricultural Competitiveness Taskforce Members,

**Re: AISAF submission to the Agricultural Competitiveness Issues Paper**

The Australian Initiative for Sustainable Aviation Fuels (AISAF; [aisaf.org](http://aisaf.org)) welcomes the opportunity to provide input into the Australian Government's "plan to grow agriculture's competitiveness, farm gate profitability and contribute to Australia's prosperity - including the prosperity of our rural and regional communities".

As its name implies, the role of AISAF is to secure the long-term future of aviation by facilitating the development of a commercial scale, sustainable aviation fuel (SAF) industry in Australia.

SAF are part of the continuum of liquid hydrocarbon fuels, which provide energy not only for aviation, but all users of transport vehicles, including the heavy logistics vehicles used in agriculture.

The 'sustainable' in sustainable liquid transport fuels is defined broadly.

- It means alternative sources of fuel that increase the diversity, security and stability of energy supply.
- It means economic security, new manufacturing jobs, and new sources of income and revitalization of rural communities.
- It means business resilience through fuel price parity and dampened price volatility.
- It means "drop in" fuels – compatible with existing supply lines, storage and blending facilities and aircraft without the need for expensive retrofitting.
- It means fuel produced from carbon that has already been emitted, not from fossil carbon.
- It means fuel with lower sulphur content than petroleum fuels. It means fuels produced with no or minimal impact on food security, water security, and biodiversity.

The National Association for the Australian Aviation and Aerospace Industries.

Initiatives of the Association:



Australia has the opportunity to be a significant leader in the sustainable liquid transport fuels industry.

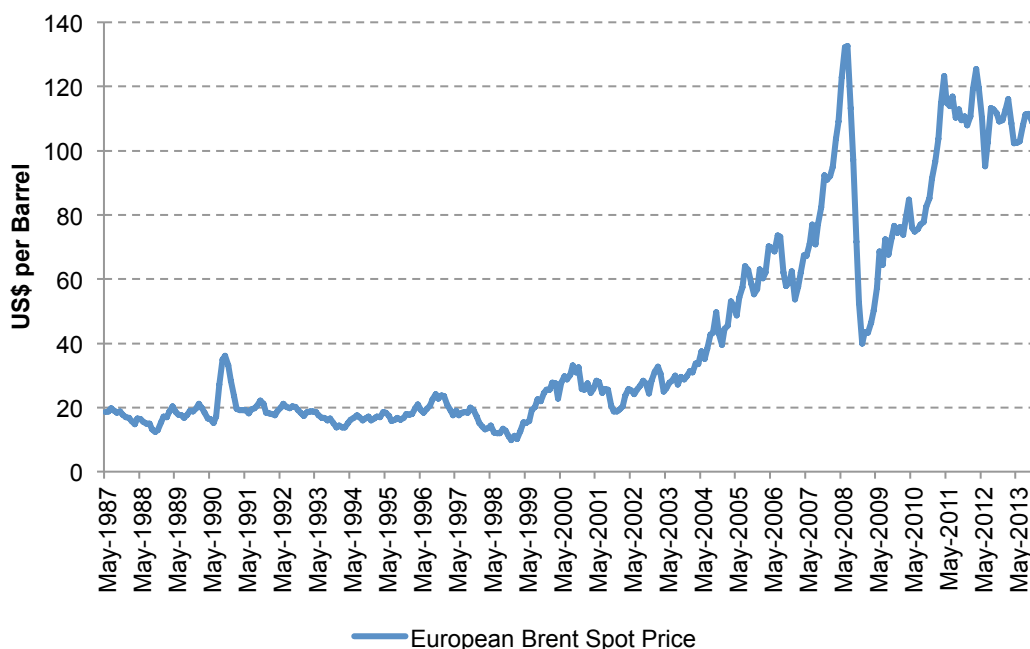
- It has natural and competitive advantages to create this industry.
- It has world-class and diverse agricultural production systems that already produce suitable feedstocks, mostly as waste streams.
- It has world-class capability in the underpinning scientific and engineering disciplines.
- Importantly, it also has airlines and heavy logistics vehicle companies that are demonstrating their willingness to be early adopters of sustainable fuels.

Development of a sustainable aviation fuel industry in Australia would increase:

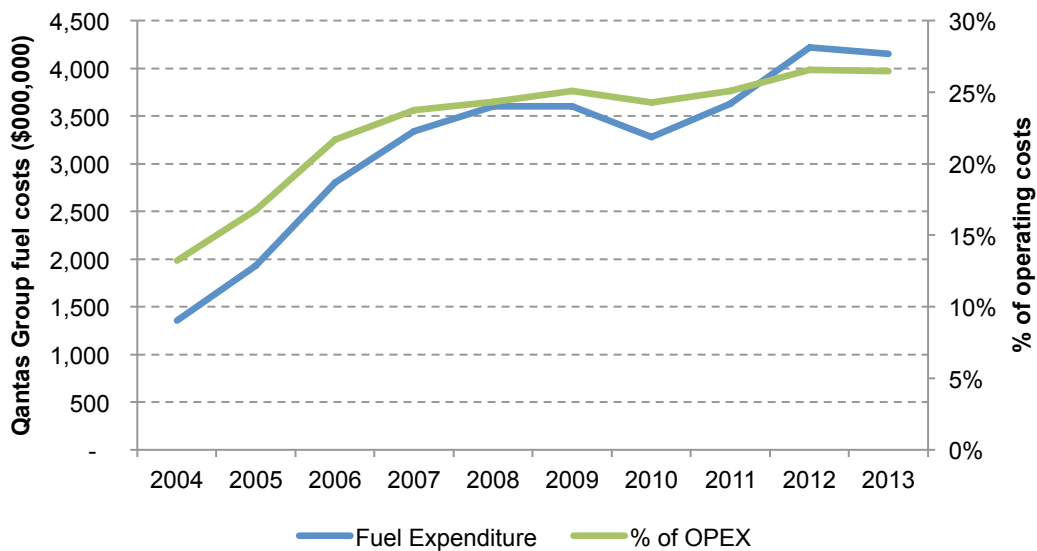
- The competitiveness of the Australian agriculture sector and its relationship to food and fibre processing and related value chains, including achieving fair returns;
- The contribution of agriculture to regional centres and communities, including ways to boost investment and jobs growth in the sector and associated regional areas;
- The efficiency and competitiveness of inputs to the agriculture value chain—such as skills, training, education and human capital; research and development; and critical infrastructure;
- Opportunities for enhancing agricultural exports and new market access; and
- The effectiveness and economic benefits of existing incentives for investment and jobs creation in the agriculture sector.

### The Energy Challenge for Airlines

Jet engines must be powered by energy dense liquid fuel. Jet fuel (kerosene) is the only viable option for aviation for decades to come. As a result of the significant increase in the price of oil, jet fuel now represents the single largest operating cost for Australian airlines. In 2012/13 the Qantas Group spent \$4.1 billion on fuel, accounting for 26 per cent of operating costs. Fuel also represented 26% or \$1 billion of operating costs for Virgin Australia.



For Qantas this has meant a rise from just 14 per cent of operating costs ten years ago to the current 26%.



Concerns about jet fuel costs are exacerbated by challenges related to security of supply. Despite assurances from the fuel importers, questions must be raised about the security of Australia's liquid fuel supply as we become almost completely dependent on refined fuel imports. Announcements during the last two years and most recently by BP this month of closure of all but three of Australia's oil refineries bring this issue to the fore.

The NRMA report on Liquid Fuel Security<sup>1</sup> released in February 2014 points out the risks of such dependence and the impacts of supply disruptions the transport sector across the board. These supply disruptions will be equally damaging to the agricultural sector. Already, reliable supply of niche fuels such as the F44 required by the Australian Navy is being questioned. Maldistribution and local shortages of diesel and jet fuel are not infrequent.

Finally, the aviation sector is also under pressure because of anthropogenic CO<sub>2</sub> emissions from resulting from its operations. In 2012, air travel globally accounted more than 2% of anthropogenic CO<sub>2</sub> emissions (677 million tonnes) predominantly from jet fuel. This amount and relative percentage will continue to rise as the aviation sector grows and other modes of transport shift to lower emission sources of energy.

Airlines have limited options to address their fuel challenges. They typically do by:

- Investing in new aircraft
  - Aircraft are very capital intensive
- Partnering with airports and air navigation service providers to improve the efficiency of aviation infrastructure
  - Airlines have no control over this infrastructure
- Maintaining a strong focus on fuel efficiency
  - This can only achieve a 1-2% improvement year on year

### Sustainable Aviation Fuels

The development and use of sustainable aviation fuel (SAF) is an equally important way in which the aviation industry can address fuel costs, security and emissions while continuing to grow the industry.

Sustainable aviation fuels have physical and chemical properties that are identical to those in petroleum jet fuel but have lower carbon emissions and meet all other sustainability criteria. Non-negotiable constraints for SAF are that they must “drop-in” seamlessly to and be interchangeable with petroleum in existing supply lines, ships, aircraft and all other vehicles, have price parity to petroleum, and significantly reduced life-cycle greenhouse gas emissions.

The American Society for Testing and Materials (ASTM) is one organization that certifies that a new SAF is fit-for-purpose. This is a well-documented and heavily scrutinized process. It ensures, above all, the safety of SAF as an energy source for flight and also that all requirements of the airline, airframe and engine manufactures are met.

ASTM has certified two SAF – one derived from plant oils and the other from biomass that has undergone gasification and conversion to SAF via the Fischer-Tropsch process. The safety and environmental credentials of SAF have been proven in a large number of test and commercial flights on SAF by commercial airlines around the world, including by Qantas and Jetstar in 2012.

Airlines are investing significant time and effort to understand and drive the development of commercial SAF supply chains in Australia.

### ***Qantas Airways***

In April 2012, Qantas operated Australia’s first commercial SAF flights from Sydney to Adelaide, which was followed a few weeks later with a Jetstar flight from Melbourne to Hobart (a world first for a low cost carrier). Both flights were operated with a 50 per cent blend of SAF with traditional jet fuel in one engine. The purpose of both flights was to raise awareness and highlight the need for a SAF industry in Australia.

Prior to the first flight in Sydney Qantas also announced, in partnership with Shell Australia, a feasibility study to understand the economic conditions under which the SAF industry in Australia could be viable, using existing supply chain and refining infrastructure.

The study, which was supported by a \$575,000 grant from the Australian Renewable Energy Agency (ARENA), was launched in November 2013 and represents the most detailed investigation to date regarding the commercial viability of the end-to-end SAF supply chain in Australia<sup>2</sup>.

The study assessed the commercial viability of a 3,000 tonnes-per-day reference facility, which would produce approximately 20,000 barrels of renewable hydrocarbons (diesel, SAF, naphtha and refinery gas) per day. Capital expenditure is approximately A\$1 billion (2012), which is consistent with industry cost values when considering that the construction of additional, as opposed to the conversion of existing, refining equipment is required in Australia. Depending on the process configuration and bio-refinery size, the SAF fraction was between 5% and 35% of Qantas’ current domestic fuel demand when certified in a 50:50 blend.

The study found that, while technically feasible, there are a number of challenges that need to be addressed in order to make the SAF industry in Australia commercially viable.

Of particular importance is the need to address feedstock economics, volume, sustainability and pricing competitiveness.

### ***Virgin Australia***

Virgin Australia, Brisbane Airport Corporation and Dutch company SkyNRG have teamed up on the Brisbane BioPort project with the ultimate goal of establishing a reliable supply of SAF to Brisbane Airport.

The Brisbane BioPort is a commercially driven partnership focused on breaking

thresholds that currently deter investments in the SAF industry. The three project partners have complementary objectives and a depth of experience in SAF.

The team will undertake an objective assessment, including the selection of the most optimal feedstock and technology combination in Queensland, working with the selected feedstock and technology players, initiate R&D where needed and perform an in-depth economic and sustainability analysis.

The approach is unique in that there is no pre-committing to a specific feedstock or technology upfront. A dedicated “supply chain development team” with capabilities covering commercial interaction, legal structuring, financial structuring, government involvement, supply chain contracting and bio-energy techno-economic will focus on determining the most promising supply chain set and securing a go/no go investment decision.

### **The Sustainable Aviation Fuels Industry in Australia**

In its *Green Growth Energy – Industry Opportunities for Australia Report* in June 2013, the Australian Academy of Technological Sciences and Engineering (ATSE) concluded that production of renewable liquid fuels, including SAF and renewable diesel, represents a new and large industry opportunity for Australia<sup>3</sup>.

“The nation’s research and development capacity and resource base provide competitive advantage to Australian business. A strategic policy for biofuels and biochemicals could enable Australia to develop a world-scale advanced manufacturing industry with significant regional opportunities.”

Importantly, the SAF industry will bring considerable opportunities for regional Australia because it will capture the economic benefits from production of the feedstocks required to establish the supply chains.

A number of industry-led and government-led studies and projects have been undertaken or instigated specifically to assess the feasibility and opportunities associated with development of the sustainable aviation fuel industry in Australia. Currently, Australia does not have any SAF production facilities.

These projects are particularly important because of the large number of stakeholders from the private and public sectors involved working in partnership.

They include:

- Flight Path to Sustainable Aviation Fuels, 2011<sup>4</sup>
- Advanced Biofuels Study. Strategic Directions for Australia, 2011<sup>5</sup>
- Sustainable Mallee Jet Fuel – Sustainability and Life Cycle Assessment, release scheduled for early 2014<sup>6</sup>
- Fuelled for Growth. Investing in Victoria’s Biofuels and Bioenergy Industries, 2012<sup>7</sup>
- Techno economic analysis of renewable aviation fuel from microalgae, *Pongamia Pinnata*, and sugar cane, 2012<sup>8</sup>

These reports demonstrate:

- That SAF are being demanded by Australian aviation in both the civil and defence sectors
- The Australian aviation industry is taking a long-term strategic approach to creating and building the industry
- The considerable economic benefits for regional, State and national economies. An SAF industry would have direct and substantial impact on GDP; bring new investment and jobs into rural, regional and metropolitan areas.
- The benefits of diversification of energy supply not only for aviation but also for industry sectors dependent on heavy logistics fuels,
- The benefits of diversification of the supply of a variety of renewable molecular

- and bio based products which feed into many other manufacturing sectors
- The potential to generate new export opportunities for Australia.
- The major challenges for his emerging SAF industry in Australia are related to deploying existing technologies at commercial scale, driving down costs and reducing risk as much as possible so that investors will finance the build out of new supply chains.

### **Relevance to Australia's Agricultural Competitiveness Issue Paper**

AISAF believes that the current review of Australia's agricultural competitiveness is an opportunity to stimulate and support innovation in our agricultural sector with a view to increasing the diversity and ubiquity of domestic and export products.

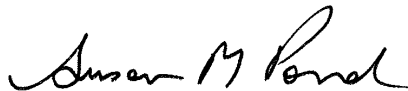
Large-scale supply of SAF derived from Australian agricultural production represents a significant new value-adding domestic and export industry for Australia. It is an industry that sits at the interfaces between agriculture, manufacturing and aviation sectors. All are critical for Australia's future.

The economics of agricultural feedstocks represent the main commercial barrier to developing the biorefineries. Renewable aviation fuel would be only one product from the bio refineries established to process the feedstocks. Bio refineries will produce a wide range of value-added products, including boutique, high price, low volume chemicals and commodities such as renewable liquid hydrocarbon fuels.

Agriculture is key to development of this industry because of the need for supply of substantial and ratable volumes of existing or new biomass, non-food feedstocks as the foundations for the supply chain. .

AISAF encourages the evolution of a policy environment for the development of this industry that is balanced and coordinated across several government departments. Policies will need to be long-term and stable so that these new and extended value chains can realize their full potential. AISAF looks forward to offering assistance to the Green Paper process as it progresses.

Yours sincerely,



D Susan M Pond AM FTSE  
Chair, Australian Initiative for Sustainable Aviation Fuel

## Links to Supporting Documentation

1. <http://www.mynrma.com.au/images/About-PDF/Fuel-Security-Report-Pt2.pdf>
2. <http://www.qantas.com.au/infodetail/about/environment/aviation-biofuel-report.pdf>
3. [http://www.atse.org.au/content/activity/energy-content/atse\\_green\\_growth\\_energy\\_report\\_2013.aspx](http://www.atse.org.au/content/activity/energy-content/atse_green_growth_energy_report_2013.aspx)
4. [www.csiro.au/science/Sustainable-Aviation-Fuels-Road-Map](http://www.csiro.au/science/Sustainable-Aviation-Fuels-Road-Map)
5. <http://arena.gov.au/files/2013/10/advanced-biofuels-study.pdf>
6. <http://www.futurefarmonline.com.au/knowledge-base-1/mallee-jet-fuel-moves-closer-to-reality>
7. [http://www.rdv.vic.gov.au/\\_\\_\\_data/assets/pdf\\_file/0007/196189/Fuelled-for-Growth.pdf](http://www.rdv.vic.gov.au/___data/assets/pdf_file/0007/196189/Fuelled-for-Growth.pdf)
8. <http://onlinelibrary.wiley.com/doi/10.1002/bbb.1404/pdf>