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The Project Manager
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Dear Sir/Madam

Towards a clean energy economy: achieving a biofuel mandate for Queensland - Discussion paper

Virgin Australia welcomes the opportunity to comment on the Queensland Government's 'Towards a clean energy economy: achieving a biofuel mandate for Queensland - Discussion paper' (the Discussion paper). In 2013/14 Virgin Australia used over 1.3 billion litres of jet fuel, making it the second largest user of liquid transport fuel in Australia. Fuel is the single largest cost for the airline and emissions associated with the combustion of that fuel account for over 98% of our total direct CO_2 emissions.

Virgin Australia is a member of the Sustainable Aviation Users Group, and through our membership of the International Air Transport Association (IATA), has committed to a series of industry emissions reduction targets. These include a commitment to carbon neutral growth for the international aviation industry from 2020. Having access to alternative jet fuels with lower lifecycle carbon emissions will be an important factor in the aviation industry's ability to meet these carbon targets.

For these reasons, since 2009 Virgin Australia has been actively investigating opportunities to develop a sustainable aviation fuel industry in Australia. The Queensland Government's desire to establish a vibrant biofuel and bio-manufacturing industry in the State presents an excellent opportunity to progress the development of an Australian sustainable aviation fuels industry.

Queensland's natural advantages

Queensland has a number of distinct advantages in terms of its potential to develop a biofuel and bio-manufacturing industry. The State has world-class research facilities and expertise in tropical crops, a well-developed and productive agricultural sector, and a number of existing biofuel facilities. The single biggest advantage for Queensland, however, is the potential for significant expansion in feedstock production due to the favourable climate, availability of land and water resources. As feedstock availability and cost are the most critical elements of a successful biofuel project, Queensland is attractive to prospective project developers.

Queensland's ability to expand its production of feedstock should not be underestimated in the global context. For example, in the European Union (EU) there has recently been a reduction in the amount of land which is available for producing biomass for biofuel production. This reflects a recognition by the EU of the requirement for arable land to be used mainly for the production of food into the future. Queensland is well placed to sustain an increase in both food production and the available biomass to sustain bio-based industries.

Challenges to be addressed

While Queensland has a clear opportunity to develop an advanced bio-economy, there are a number of challenges that need to be recognised and addressed. The cost of developing a bio-refining industry is significant. Depending on the scale of a facility, the technology being employed and the suite of products being produced, each facility can cost hundreds of millions of dollars. Companies and investors that are able to support this level of investment are usually considering a number of different locations for potential projects. These companies will be assessing a range of factors such as feedstock cost and availability, construction costs, operating costs, transport costs, access to key inputs (land, permits, utilities, transport infrastructure), potential markets for their products, and other drivers such as key customers and offtake agreements.

Much of the employment and investment generated by bio-based industries occurs in regional areas close to the feedstock. However, many of Queensland's important regional centres have infrastructure constraints, particularly with respect to natural gas availability, that may be a deterrent to large industrial investment. The availability of natural gas is important for many biofuel projects, as a number of the most promising conversion technologies require de-oxygenation to produce certain fuels, and natural gas can be an important input into this refining process. Natural gas is also used for thermal heat in many biofuel conversion processes. Despite the existence of plentiful natural gas resources in Queensland, most regional centres currently lack sufficient pipeline infrastructure and capacity to support new major industrial users.

Another major challenge is the lack of existing refinery infrastructure. The closure of the BP Bulwer Island Refinery continued a pronounced trend in Australia away from refining fuels and towards the importation of fuel. This has a range of implications not only for major fuel users, but also for the development of a viable advanced biofuels industry in terms of the cost of constructing facilities, due to the need for bio-refineries to be capable of undertaking all refining steps. In many other countries there would be an opportunity to utilise existing refining infrastructure for parts of the fuel production process, including hydrotreating/hydroprocessing. The loss of refining capability may also create skills shortages for project developers looking to establish new facilities in Queensland which require this refining expertise.

These kinds of challenges, along with relatively high construction and other operating costs in Australia, can serve as barriers to investment. To overcome these issues, a sustained focus on the attractiveness of Queensland as an investment destination will be important in supporting the development of an advanced bio-based industry.

International best practice

Many countries (and states) around the world have implemented biofuel mandates in one form or another. A common theme in the implementation of these mandates is that, while sending important market signals, they were not designed solely to promote the development of a biofuels industry for economic reasons. The United States (US) Government has a stated aim through policies such as the Renewable Fuel Standard (RFS), to reduce its dependence on imported fossil fuel. The policy is as much about energy security as developing the biofuel industry and supporting the agricultural sector. The EU biofuel mandate was largely driven by broader environmental policy and a desire to reduce transport-related carbon emissions.

Importantly, these macro policy drivers have allowed governments in the US and the EU to actively support the development of biofuel industries beyond the creation of a mandate. By way of example, the US Department of Defence has played a critical role in the scale-up and commercialisation of the US advanced biofuels industry by funding research, testing fuels and most importantly, being a key customer for the fuels produced (including subsidising the high cost of fuel during small scale and first commercial production). Absent this additional support, it is unlikely that a mandate alone would have seen the significant private sector investment and technological advancements that have occurred since the RFS was first implemented.

The benefits of advanced biofuels and the implications of an ethanol mandate

It is pleasing to see that, while proposing an ethanol mandate, the Discussion paper focusses on the opportunity to look beyond first generation ethanol and to seek to develop an advanced bio-economy. Advanced (second generation) fuels, chemicals and bio-based materials all present a significant opportunity for economic development in Queensland. The markets for many of these products are large and established and offer significant long term export potential. In the fuel market, advanced biofuels such as sustainable aviation fuels can also have significant lifecycle carbon emissions benefits when compared to fossil fuel equivalents. This is in contrast to first generation biofuels, which are generally produced directly from food crops, and often have comparatively limited environmental benefits.

For this reason, many of the leading biofuel producing countries, such as the US and Brazil, have implemented policies that support the development of their first generation biofuel industries, while also creating additional incentives to move towards the development of advanced biofuels and chemicals, for example cellulosic ethanol. Advanced biofuels tend not to compete with food production and the feedstocks for them are often wastes or low value products. As a result, the use of these feedstocks can also be beneficial in providing diversified income streams for farmers.

In order to capture the longer term benefits of an advanced bio-based industry in Queensland, it will be important to ensure that the policy framework carefully considers the implications of an ethanol mandate. A mandate will have the obvious consequence of directing investment towards the production of additional first generation ethanol, and this may impact or delay investment in advanced biofuels and bio product manufacturing, as it will create competition for resources such as land, water, utilities and, in particular, certain feedstocks.

In addition, the drivers of project investment must be explored in the context of an ethanol mandate. Generally project developers and investors will seek to secure long term customers before investing substantial amounts in bio-refining infrastructure. While an ethanol mandate creates a market requirement for a particular volume of ethanol, it does not necessarily create a lasting demand beyond the timeframe for the mandate. This can be seen in the case of the NSW ethanol mandate, which has been in place for many years, but not led to a significant customer preference amongst motorists for fuel containing ethanol. Consumer preference in NSW appears not to favour E10 fuel, and in fact there has been a large increase in NSW in the sale of premium unleaded petrol since the mandate was introduced in 2007. The ability for road users to substitute fuel types (LPG, diesel, electric, hydrogen) also makes it unclear what the long term demand for petrol (and petrol additives such as ethanol) will be for Queensland. In contrast, there is a significant demand from airlines for sustainable aviation fuels as a result of the important role they can play in reducing airline emissions. There is also significant demand for renewable chemicals and advanced bio-based products globally. As this demand is customer led, it is likely to require less long term government support once established.

The environmental benefits of advanced biofuel manufacturing coupled with the significant commercial benefits that this industry can contribute, mean that careful consideration should be given to how this and other advanced bio-based industries can be encouraged to develop alongside the traditional ethanol industry. While there are a number of ways this could be achieved, in Virgin Australia's view, a longer term requirement for a cellulosic ethanol mandate to complement the proposed first generation ethanol mandate would represent a prudent approach.

Renewable diesel

Another fuel of particular interest to Virgin Australia is renewable diesel. Renewable diesel has some particular characteristics that make it a suitable blendstock in fossil based aviation fuel. Boeing has been pursuing certification of the use of renewable diesel in a blend of up to 10% with jet A1 through the American Society of Testing and Materials (ASTM). In December 2014 Boeing undertook successful test flights using a blend of 15% renewable diesel and it is expected that ASTM approval will be granted for the use of renewable diesel for commercial aviation purposes within the next 12 months. This creates a key near term opportunity for the aviation

industry to be able to incorporate renewable diesel into its operations and to reduce carbon emissions. While some of the most promising advanced biofuel technologies are still being developed or commercialised, there is already significant production of renewable diesel globally (particularly in Europe and Singapore). The certification of renewable diesel by the ASTM would create an important opportunity for Queensland to contribute to the supply of this fuel. Against this background, Virgin Australia believes that it should be included amongst the fuels under consideration for future policy priorities.

The need for central policy coordination

A clear attraction of bio-based industries for government is that they support a broad range of industry sectors. However, this can lead to confusion and tension in the development of policy frameworks. There are good arguments to support biofuel policy sitting with any of the transport, science and innovation, state development, energy and resources or agricultural portfolios. In order to attract investment into the sector and to ensure centralised policy coordination, Virgin Australia believes it is important that the Queensland Government identifies a single Minister and portfolio that will have primary responsibility for the development of bio-based and industry policy.

Virgin Australia thanks the Queensland Government for its leadership in seeking to establish an advanced bio based industry. Should you require any further information in relation to the matters set out above, please do not hesitate to contact Robert Wood, Head of Sustainability [redacted]

Yours sincerely

J. McKeon

Jane McKeon
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