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Submission

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Australian Renewable Energy Agency
GPO Box 643
CANBERRA ACT 2601

Emailed via: bioenergyroadmap@arena.gov.au
Submission form via: arena.gov.au/bioenergy-roadmap

To Whom It May Concern

Re: ARENA Bioenergy Roadmap, Call for Submissions (April 2020)

The Queensland Farmers' Federation (QFF) is the united voice of intensive, semi-intensive and irrigated agriculture in Queensland. It is a federation that represents the interests of peak state and national agriculture industry organisations, which in turn collectively represent more than 14,000 farmers across the state. QFF engages in a broad range of economic, social, environmental and regional issues of strategic importance to the productivity, sustainability and growth of the agricultural sector. QFF's mission is to secure a strong and sustainable future for Queensland farmers by representing the common interests of our member organisations:

- CANEGROWERS
- Cotton Australia
- Growcom
- Nursery & Garden Industry Queensland (NGIQ)
- Queensland Chicken Growers Association (QCGA)
- Queensland Dairyfarmers' Organisation (QDO)
- Australian Cane Farmers Association (ACFA)
- Pork Queensland Inc.
- Queensland United Egg Producers (QUEP)
- Queensland Chicken Meat Council (QCMC)
- Bundaberg Regional Irrigators Group (BRIG)
- Burdekin River Irrigation Area Irrigators Ltd (BRIA)
- Central Downs Irrigators Ltd (CDIL)
- Fairbairn Irrigation Network Ltd
- Mallawa Irrigation Ltd
- Pioneer Valley Water Cooperative Ltd (PV Water)
- Theodore Water Pty Ltd.

QFF welcomes the opportunity to provide comment on the ARENA Bioenergy Roadmap: Call for Submissions paper (April 2020). We provide this submission without prejudice to any additional submission from our members or individual farmers.

Context of Review

Bioenergy is energy generated from solid, liquid and gaseous products that have been predominantly derived from biomass. Biomass is any organic matter (biological material) that is available on a renewable basis, including material derived from animals or plants, municipal or industrial waste. End-uses include heat, electricity and transport fuel.

Given the availability of cost effective and environmentally beneficial feedstock sources, the bioenergy sector has significant potential to assist with both Queensland's and Australia's energy transition and to help Australia further reduce our emissions. This is complimentary to many Queensland initiatives the Queensland Climate Transition Strategy supporting zero emission targets; Queensland Waste Management and Resource Recovery Strategy which supports circular economy principles; the Biofutures Roadmap; and the Powering Queensland Plan which includes targets for renewable energies.

The discussion paper notes that it is generally viewed by industry that the development of Australia's bioenergy sector has not matched global development (as measured by contribution to energy consumption compared to other OECD countries). QFF supports this view.

QFF understand that ARENA is investing in the development of a roadmap to identify the role that the bioenergy sector can play in accelerating Australia's energy transition, stimulating regional development, enhancing energy security and helping Australia further reduce our emissions. And that the Bioenergy Roadmap will inform the next series of investment and policy decisions in the bioenergy sector, as well as being an important input into the Australian Government's Technology Investment Roadmap.

QFF provides this submission in response to the views sought on:

- opportunities where the bioenergy sector in Queensland may have a competitive advantage
- the role of biofuels to help decarbonise the industrial and transport sectors and contribute to Australia's liquid fuel security
- opportunities to decarbonise the gas network
- current economic and regulatory impediments to the development of the bioenergy sector in Queensland
- insights into the economic opportunities for Queensland.

Background

The agricultural sector is critical to the Queensland economy, providing food, fibre, foliage and increasingly, renewable fuels. The sector is instrumental in managing the challenges associated with population growth, food security, climate change and natural resource management.

Queensland's agricultural industries are comprised of:

- plant industries, including field crops (sugarcane, cotton, grains and pulses); production horticulture (nuts, fruit and vegetables); lifestyle horticulture (turf, flowers, nursery and landscaping); and forestry
- animal industries, including livestock and livestock products (including cattle, sheep and pigs, poultry, kangaroos, fish/aquaculture) and livestock products, such as wool, dairy, bees/honey and eggs.

Of all Australia's states and territories, Queensland has the highest proportion of agricultural land, accounting for 3 per cent of total area of in Australia. Queensland is also the largest contributor to the area of grazing land, with an estimated 129 million hectares of land used for grazing in 2016-17[1].

[1] ABS (2018a). Australian Bureau of Statistics. Catalogue No. 46270DO001_201617 Land Management and Farming in Australia-2016-17. Released 26/06/2018.

For 2019-2020, the total value of Queensland's primary industry commodities (combined gross value of production and first-stage processing) is forecast to be $17.80 billion, 5 per cent less than for 2018-19 and 6 percent less than the average for the past five years[2], primarily due to drought. Queensland accounts for between a quarter to one third of Australia's agricultural production value. As such, there is considerable bioenergy potential to be realised in Queensland.

Queensland's agricultural sector has an established history of managing its waste streams effectively, ranging from innovative value-add products on-farm to combat food waste, organics and nutrient recycling, and bioenergy production. Continuous technology developments are also increasing our sector's ability to actively participate in bioeconomy and biochemical markets, including in the manufacture of bio-based fuels.

Many farmers and agricultural processors have a long history of using organic waste streams, such as straw and trash, by incorporating it into their soils to enhance soil carbon or for bioenergy production. However, there are new 'biofuture' opportunities arising for the sector to value add to resource streams and agricultural by-products to realise bio-economy efficiencies and maximise financial returns. Research and governments are driving changes to policy and funding arrangements to maximise these opportunities which strive to move organic residuals and agricultural by-products up the value chain and, in certain cases, away from the existing circular economy model; essentially valorising its waste streams.

Queensland's agricultural sector is the largest provider of base-load renewable energy from resource streams, including energy from waste as defined under the *Renewable Energy (Electricity) Act 2000 (Cth)*, contributing over 1,200GWH of renewable energy annually (both behind the meter and for export to the grid).

The agricultural sector (agri-processors in particular) are significant stakeholders in the energy from waste, bioenergy and renewable energy sector. As an example, bioenergy includes the energy derived from the biomass components of an energy source mentioned in any of paragraphs (i) to (s) of the definition of eligible renewable energy source (as defined within subsection 17 (1) of the *Renewable Energy (Electricity) Act 2000 (Cth)).*

Australia's agricultural sector is the largest single adopter of Clean Energy Finance Corporation (CEFC) loans (at 26.5 percent), with the average project amount financed in the agribusiness sector being $248,998. Thus, indicating the maturity and innovation of the sector in both energy efficiency and renewable energy projects and infrastructure.

If bioenergy sources or significant resource and by-product producers such as agriculture are to be included, then further stakeholder consultation is essential. QFF recommends as a minimum, peak agricultural associations, Bioenergy Australia; Biofuels Association; Macadamias Australia; and the Australian Sugar Milling Council. The agricultural sector (including agri-processors) must be involved in the future development of the Bioenergy Roadmap.

Acknowledgment of Heat Values and Liquid Fuels

In many of the existing agricultural and agri-processing facilities, the value of heat and steam is already well known and recognised. Any Roadmap must recognise the contribution of heat and fuels (liquid and solid). The value of any electricity and heat generated can make a substantial difference to the ongoing economics of a bioenergy generation facility, but the practical uses of the two energy forms are very different. Electricity is easy to transmit from the point of production to the point of use, as long as an appropriate local grid connection is feasible. In contrast, heat energy needs a user close to the point of generation, otherwise the transmission losses (and infrastructure costs) quickly become prohibitive.

[2] Queensland Government (2020). Queensland AgTrends 2019-2020. Department of Agriculture and Fisheries.

The value of that electricity depends on the contract agreed. Retail electricity prices are estimated using a 'building block approach' incorporating each of the following cost components:

- Wholesale electricity market costs
- Network service provider costs
- Cost of green schemes (for example, those under the Renewable Energy Target)
- Cost of state and territory energy efficiency schemes, if any
- Cost of state and territory feed-in tariff schemes
- Market system operator charges
- Retailer costs and margins and
- GST.

Estimating the value of any heat generated is much more difficult. Firstly, the useful heat generated is usually dependent less on how much heat the facility can produce but how much heat the receptor requires, and how close that receptor is to the generating point. Whilst electricity is the same regardless of how it was generated, there are endless degrees of heat, depending on the temperature and pressure of the water or steam (or other fluid) used; and few heat-producing waste/bioenergy treatment facilities are designed as heat-only plants, instead operating as combined heat and power plants. Thereby, within certain limits according to the plant design, the amount of heat generated can be varied according to demand, with the balance converted to electricity.

QFF also notes that there are frequently barriers to feeding into the networks and a lack of transparency regarding some feed-in tariffs. Barriers for farmers wishing to connecting renewable energy technologies to the grid in Queensland are well documented (see QFF-led research and reports at https://www.qff.org.au/wp-content/uploads/2019/03/Barrier-Summary-Report-2019.pdf)

The current paper does not acknowledge the complexity or impact of the National Electricity Rules and other regulation (such as planning) on the development of the bioenergy sector.

Planning Issues

The current paper does not address or reference planning. To maximise efficiencies, planning to facilitate co-location of ancillary activities and aligned plant needs to occur where possible.

As an example, within Queensland's current planning framework there are substantial limitations to maximising bioenergy technologies. The co-location of production, processing and energy facilities on farm is becoming more difficult under local government planning. A current example is of a significant horticultural producer and processor who wanted to create an agri-precinct including the co-location of a bioenergy facility which would provide heat and both behind the meter as well as export electricity. This was refused by their local council. The inconsistency of planning instruments and lack of 'planning' transparency across local government areas presents a considerable barrier to business and a barrier to realising 'products being processed and utilised closer to the point of generation' and where 'regional hubs and precincts can provide economies of scale'.

Duplicate and Retrospective Regulation

QFF remains deeply concerned of further duplicative and retrospective regulation of the existing energy from waste/renewable energy facilities. For example, Queensland has 14 anaerobic digestion (AD) facilities registered with the regulator (Petroleum and Gas Inspectorate, Department of Natural Resources Mines and Energy) who regulate the *Petroleum and Gas (Production and Safety) Act 2004* and subordinate regulation.

This is despite Queensland's unique position as a substantial agricultural producer and, also given at face value, policy support under the 'Biofutures' agenda at state level and the Food Waste Strategy at federal level, amongst other policies.

The Queensland Government has failed to recognise the potentially significant contribution of AD in achieving the desired outcomes of so many policy agendas, such as managing greenhouse gas

emissions, increasing renewable energy generation, diverting organic waste streams from landfill and moving organic resources towards a more circular economy approach.

On a small scale, the agricultural sector and food and beverage producers have recognised the substantial opportunities to reduce emissions by recycling methane-producing wastes such as manures and food processing wastes; and the ability of AD to offset high peak electricity prices or negate obligations under the Safeguard Mechanism.

However, these incentives are insufficient on their own to stimulate Queensland's AD sector and are now being eroded by excessive state-based regulation. For example, in November 2018, changes to Queensland's *Environmental Protection Regulation 2008* (EP Reg), introduced a licence requirement for AD under a revised Environmentally Relevant Activity (ERA53 – Organic Material Processing). The *EP Reg* is administered by the Department of Environment and Science. The revised ERA (and licence requirement) rightly excludes on-farm AD and AD plants associated with wastewater treatment and meat processing; however, many farms seeking to utilise AD will need economies of scale which may require 'importation' of other organic wastes – this would immediately trigger the requirement for an ERA. This in turn triggers many local government planning mechanisms including a Development Approval and a Material Change of Use.

The associated annual fee with the ERA53 is $4,433.60 (correct up until 1 July 2020). This is not including the application fee and associated costs of making the application or meeting any requirements imposed by the conditions of the Environmental Authority. This is also in addition to current regulation and fees imposed onto AD facilities by the Department of Natural Resources, Mines and Energy.

It remains to be seen how the increased regulation, administrative burden and annual government charges will impact the 14 existing AD facilities, or future investment plans for other facilities in Queensland, but it will more that negate any current savings from electricity costs and possibly heat.

Biogas Substitution

QFF supports the recognition of biogas (biomethane etc.) as a 'low regret option' for decarbonising the gas grid and potentially stimulating a supply market, (be it small), to compete with CSG. If this would stimulate lower gas domestic prices is open for debate and would be dependent on the level of supply which, in the first instance, is likely to be limited to being site specific. Many countries do export gas from ADs into their natural gas grid and utilise the heat generated to fuel industrial processes or transfer heat energy to cooling.

To build investor confidence in the AD industry and the required organic supply chain, there must be recognition of the contribution of organics and the bioenergy sectors (including biomass, biogas, biofuels and bioliquids) to the renewable energy agenda and net zero carbon emission targets.

We need to start to critically explore how current business models compare between the waste management, agricultural and wastewater sectors and where can we find synergies or make the necessary amendments. We also need regulation appropriate for innovations in microbiological process and AD technologies which does not impede the sector. We need to continue to provide research and investment into the biofutures and bioenergy agendas to value-add to these processes, for example to determine if non-biomethane end points deliver more value from current or future AD assets.

Biofuels

QFF has previously made a detailed submission on biofuels and the *Queensland Biofuels Mandate* (in 2019) which can be accessed at:
https://www.qff.org.au/wp-content/uploads/2017/04/20190701-Submission-to-DNRME-re-Review-of-the-Queensland-Biofuels-Mandate-WEB.pdf

The submission identifies impediments and opportunities for the sector and a discussion surrounding the role and effectiveness of mandates.

Existing Bioenergy Projects in Queensland

Sugar mills have been generating renewable energy from waste sugarcane fibre for approximately 100 years in Australia, meeting their own electricity needs and exporting excess electricity to local networks. Many of the existing REC registered thermal units are sugar mills. There are 24 sugar mills in Australia, 23 of which are in Queensland. Australian sugar milling is a diversified agricultural and regional manufacturing industry. Sugar mills utilise their waste streams with bagasse used to generate electricity and steam. Most of the boilers in the industry are grate fired. All mills ensure that they have capacity to move between biomass and other solid fuels (including coal or biomass-derived fuels) in some instances.

The 23 Queensland sugar mills export additional electrical capacity to the grid. Invicta, Pioneer and Victoria Mills have upgraded cogeneration facilities to increase their export capacity. Pioneer's cogeneration plant is the largest biomass generator in Australia. Surplus bagasse produced in the Burdekin mills during the crushing season is stockpiled on large, specially designed pads at Pioneer to enable the cogeneration facility to continue to operate outside of the crushing season.

Invicta, Isis and Rocky Point Mills all provide over 30MW generating capacity. Subject to the boiler design and mill operations, approximately 15 per cent of the original energy in the bagasse is being converted into electricity and exported to the grid. When the mill is not crushing, approximately 20 per cent of the original energy in the bagasse is converted into electricity and exported to the grid.

The RET provides an incentive for increasing energy efficiency at sugar mills. By storing and managing bagasse out of season, and increasing boiler efficiencies, mills have increased electricity generation, supplying their neighbouring communities. However, the efficiency of many mills could be improved by finding a homogenous feedstock for all-year energy production.

Sugar mills play an integral role in a low carbon economy into the future, and currently represent an under-utilised energy resource for bioenergy. The sugarcane plant is one of the world's most efficient converters of solar energy into chemical feedstock, making it suitable to derive a range of products such as electricity and ethanol; and into the future, other biofuels and biochemicals.

Sugar milling companies have the capacity to significantly expand their production of renewable electricity and biofuel, with no expansion to the existing industry footprint. These expansions can have payback periods in excess of 10 years and as such, require the right policy settings to provide the necessary investor confidence.

This capacity has been expanded since the Commonwealth Government's Mandatory Renewable Energy Target (MRET) was introduced in 2001, so that all sugar mills can export surplus electricity into regional distribution networks during the crushing season (June to November). There are some cogeneration projects that now generate for 50 weeks of the year and are base-load generators in terms of reliability. This expanded cogeneration capacity increases regional energy security and reduces the Queensland Government cost of Community Service Obligations.

With the right policy settings, the potential contribution to renewable energy (and firming of that energy) could be substantially expanded. Sugar mills and other biomass generation facilities have an important future role in the development and support of regional microgrid opportunities.

Examples of Tools and Support

The UK and some European countries have strongly embraced the use of anaerobic digestion. For example, the UK government has made a commitment to increasing the proportion of green gas in the grid in order to decarbonise the UK's heat supply, with support through attractive 'Feed in Tariffs' (FiT) and, more recently, new targets targeting the diversion of organic wastes. With the UK Government commitment to rolling out universal food waste collections in England to send inedible food waste to be recycled into green gas through AD. This is further supported by phased bans of organic waste to

landfill and incineration, to recent strategies including mandatory household organic collections by local government.

The UK's FITs scheme set out in the *Feed-in Tariffs (Specified Maximum Capacity and Functions) Order 2010*, operates alongside the Renewables Obligation, under which large scale renewable energy facilities, including Anaerobic Digestion Plants, have for a number of years been incentivised for the deployment of large-scale renewable electricity generation.

The concept embodied within the FiTs is that it provides a comprehensive mechanism, to deliver a predictable level of return on renewable power installations. This was proven in the UK to maintain and increase interest from investors by relatively securing profitability, of generating electricity in the small scale and by non-traditional methods. The scheme also incentivised the use of organic farm residues and by-products as feedstocks. As a result of the support, the UK experienced new investment and a steady deployment of incentivised smaller scale technologies. This produced innovation, stakeholder collaboration (between farmers, local government, technology providers and private investors), created jobs, increased manufacturing and provided a good geographical range of installation opportunities.

In 2019, the UK government removed FiT applications to new facilities, whilst honouring existing commitments to continue paying FiT to existing AD plants within the scheme. Feedback regarding the removal of the FiT has been mixed, with many proponents believing that there was further opportunity for sector development.

QFF supports a similar scheme specifically for AD and other biogas type-technologies which utilise waste organic resources. The co-location of AD with agriculture and agri-processing also provides opportunity for the on-site use of waste heat (for heating or cooling), hence promoting further efficiencies.

Conclusions

The agricultural sector is a critical stakeholder in the bioenergy economy and, as such, must be a critical stakeholder in the development of policy and support mechanisms for the sector.

Domestic policy settings are critical determinants of agricultural productivity and bioenergy adoption as they shape farmers' incentives and capacity to innovate, improve productivity and adopt new technologies. The imperative of a strong, sustainable and resilient agricultural sector is essential to provide social and economic value to Queensland's rural areas, provide food security and participate beneficially in the bioeconomy (including bioenergy applications). As such, there must be economy-wide agricultural policy settings which create conditions conducive to innovation to ensure an efficient and effective agricultural sector.

Yours sincerely

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Chief Executive Officer