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BIOENERGY AUSTRALIA SUBMISSION

Draft 2020 Integrated System Plan

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The purpose of this submission from Bioenergy Australia is to highlight that bioenergy is a flexible and dispatchable source of electricity and heat that can be used to support reliability and security of the grid.

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.

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.

Bioenergy Australia is delighted to see that a number of renewable energy sources have been acknowledged as key contributors to the security and reliability of the electricity network, but we are disappointed by the lack of reference to biomass and its role in supporting the National Electricity Market (NEM).

The AEMO has noted that maintaining energy security in the NEM will require significant new dispatchable capacity as coal-fired power stations retire.

Bioenergy is a flexible and dispatchable source of electricity generation that can be used to support reliability and security of the grid. Biomass can be considered a type of "green battery" with very high energy storage capacity, which it is unaffected by temperature and indefinitely retains its charge.

Table 1 sets out types of bioenergy technologies that can be used for electricity generation.

Technology	Description	Dispatchable
Biomass combustion	• Heat produced by direct combustion of biomass material in a boiler is used to produce electricity via a steam turbine or reciprocating engine. • Most types of biomass feedstock can be used in the process. • If waste heat is also utilised the efficiency can be 80 %-90%.	✓
Co-firing	• Co-firing is the combustion of biomass materials with fossil fuels, such as in coal-fired generators. • Co-firing of solid biomass, such as wood pellets, has become common in European and Asian counties. • Co-firing is relatively low cost compared to a new power station, and emissions of an existing coal-fired plant can be reduced.	✓
Gasification	• Gasification is a process where biomass is transformed into biogas at high temperatures without combustion. • Syngas is used in internal combustion engines or gas-fired generators to produce electricity.	✓
Anaerobic digestion	• Anaerobic digestion is the biological degradation of biomass in oxygen-free conditions. • Anaerobic digestion produces a methane-rich biogas that can be used as fuel for a gas-fired generator or (gas converted) internal combustion engine. • Biogas can be upgraded to biomethane in the form of gas (at near ambient pressure, compressed natural gas (CNG), or liqufied natual gas (LNG)). It can then be used for peak power production.	✓

Table 1: Bioenergy technologies for electricity generation (Source: Bioenergy State of the Nation Report)

In addition to the technologies included in Table 1, there are emerging technologies which can efficiently convert solid biomass into conventional liquid fuels for direct use in decentralised power generation (e.g. liquid-fraction) or electricity (e.g. Indirect Solid Fuel gas Turbine).

IEA estimates indicate that in 2018 power generation from biomass increased an estimated 8%, maintaining average growth rates since 2011, with bioenergy being one of only two technologies seeming to be “on track” with targets in the power sector.

In 2017, biomass was estimated to make up only 1.4 per cent of Australia’s total electricity production.

With wind and solar playing a dominant role in the energy transition, the integration of these intermittent energy sources with the electricity supply grid places significant pressure on grid operation and management. While considering solutions and strategies in balancing the grid, bioenergy, in its various forms, can provide significant system support roles.

Bioenergy can play a significant role in the energy transition by providing flexible and dispatchable generation capacity to support and complement variable wind and solar.

The supply of electricity from the wind or sun cannot be controlled, reliably predicted or managed to meet peak demands for firming supply. Furthermore, the renewable electricity from wind or solar is often provided in times when demand is low and the electricity has to be stored or wasted. There is a growing market need to create solutions for industrial scale, cost effective electricity storage capacity.

As an example, biomass from sugar processing is a particularly rich renewable energy resource, that could generate large amounts of electricity at relatively low cost while balancing intermittency in a similar way to fossil thermal energy. For instance, bagasse generation from the sugar mills in QLD and northern NSW already provides over 400MW of baseload green generation to the NEM. Many projects are already successfully operating on the ground, such as the Cape Byron Power, operated by Cape Byron Management, which consists of two 30 MW biomass fired power stations, on the NSW north coast. Together, these form one of the largest renewable base load generators in Australia. More projects are emerging to support baseload renewable energy production. One example is the MSF Sugar's Tableland Mill, which is expected to provide 24MW generation capacity, enough to power 26,280 homes – which is the entire population of the Tableland region.

The energy market transformation to provide capacity optimized system is required when the share of intermittent or uncontrollable electricity becomes large. Despite the significant regional differences in solar and wind resources, the fast-declining production costs of solar and wind power will further drive and accelerate the need for transformation. In this kind of future energy system, energy will not be the limiting factor, but rather security of supply will be the critical requirement. Conventional dispatchable energy production will be pushed out of the market due to higher operating costs, thus being dispatched less frequently; and thereby, becoming even more unprofitable due to low operating hours. Price fluctuation will increase, and capacity-based market instruments will most probably be introduced to address security of supply.

Being well suited to powering many existing regional manufacturers and communities, bioenergy can play a key role in easing grid demand in strategic locations. Industrial facilities often take advantage of co-location, waste centralisation and cogeneration. Bioenergy assets located in those communities will reduce transmission losses and distribution costs. It will remove demand at the extremities of the grid which would be an attractive outcome to market participants.

Finally, although we acknowledge that AEMO's interest is mainly in electricity, we would like to highlight the potential impact of renewable heat in the reliability of the grid, as the electricity demand can be significantly reduced if heat and electricity can be supplied through bioenergy and co-generation. A major impediment to bioenergy uptake in Australia has been the sole emphasis on renewable electricity rather than the whole energy sector (including renewable heat) in previous climate change/energy policies, including the Renewable Energy Target (RET) framework. The RET only recognised the renewable energy benefits from electricity production and not the benefits from the generation of renewable heat energy in the large-scale component of the RET, despite recognising solar hot water energy in the Small-scale Renewable Energy Scheme (SRES). This has constrained bioenergy investment in renewable heat and cogeneration opportunities. This policy inequity needs to change. Australia's regional manufacturing industries (including wood and paper products) use heat

energy for a wide variety of applications, including drying, preheating, and process heating (e.g. steam for process drying in papermaking or sawmills). The significant size and scale of industrial heat energy use represents a unique opportunity for renewable generation. Conversion to bioenergy for either direct electricity or heat energy needs, will remove demand for grid electricity which would be an attractive outcome to market participants.

Bioenergy (both in bioelectricity and renewable heat form) can be used to relieve the pressure on system level management of the grid by making the grid more stable. Therefore, we invite the AEMO to acknowledge biomass as a strategic component of the total energy mix and to support the role of bioenergy as an effective, low carbon and low-cost grid management and energy storage option.

Thank you for the opportunity to provide this submission.

Yours sincerely

CEO Bioenergy Australia