3 March 2017

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Australian Forest Products Association (AFPA) comment on the Preliminary Report of the Independent Review into the Future Security of the National Electricity Market

The Australian Forest Products Association (AFPA) welcomes the opportunity to comment on the Preliminary Report of the Independent Review into the Future Security of the National Electricity Market.

AFPA is the peak national body for Australia's forest, wood and paper products industry and represents 90% of the industry by value. AFPA represents industry interests to governments, the general public and other stakeholders on the sustainable development and use of Australia's forest, wood and paper products.

The forest, wood and paper products industry is Australia's 6th largest manufacturing industry with an annual turnover of $22 billion. It contributes around 0.6% to Australia's gross domestic product and 6.7% of manufacturing output. Around 120,000 people are directly employed along the whole of industry value chain with a further 180,000 jobs supported through flow-on economic activity.

AFPA has had a long history of stakeholder engagement on the development of domestic energy policy and associated domestic climate policy schemes, as well as on international climate change negotiations and related policy measures.

1. Forest product industries and energy

Wood and paper product manufacturing companies are major energy users, so their competitiveness in domestic and international markets is greatly influenced by energy pricing and policy.

Our wood and paper product industries are emissions-intensive and highly trade-exposed, and with the high Australian dollar and weak global markets in recent years, have been under severe commercial pressures. Our industries, like many other manufacturing industries, have experienced limited nominal price rises (price declines in real terms) for their products (i.e. commodities) for many years coupled with increasing quality and performance demands.

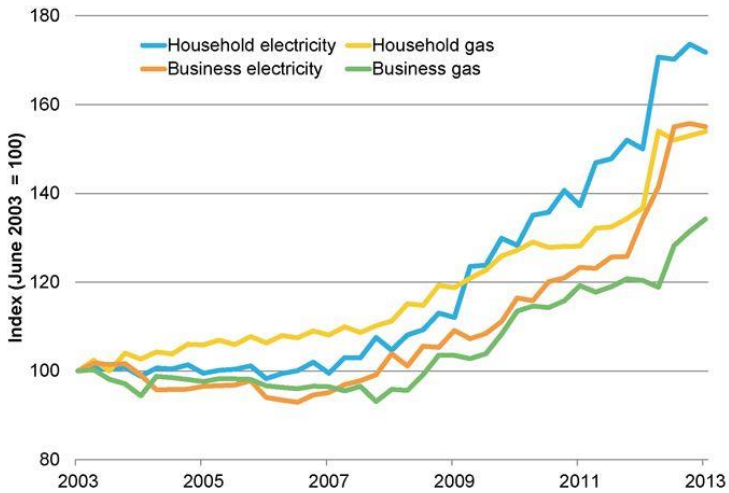
Historically, Australia has had reasonably stable and competitive energy prices by developed world standards. However, over the last 10 years, Australia has experienced significant unit energy price rises (**see Figure 1 and 2**), decreasing energy reliability and increasing market complexity all working together to erode value. Further compounding the issue, the total delivered costs of energy for manufacturers, including transmission and market costs, have significantly increased in both quantum and variability over that timeframe.

If Australian manufacturing is to remain competitive in international markets, it is important that Australia's energy policies do not disadvantage domestic operations by subjecting emissions-intensive trade-exposed industries to costs not faced by competitors in other countries. Maintaining our trade competitiveness is crucial to ensuring Australia can meet our emissions reduction goals without significant adverse social and economic impacts.

Despite the difficult economic conditions in recent years, our industries have remained viable by having a unique product or service offer, containing costs through increased efficiency and scale, and competitive sourcing of raw material inputs. However, our industries are unable to control the costs of inputs, including energy and energy distribution costs which essentially come from non-import-competing monopoly sources. These sources have little incentive to contain costs, as they can pass them on through the supply chain. In contrast, our companies, who are primarily price takers on world markets, have little to no chance of reasonably passing the imposed costs through the supply chain.

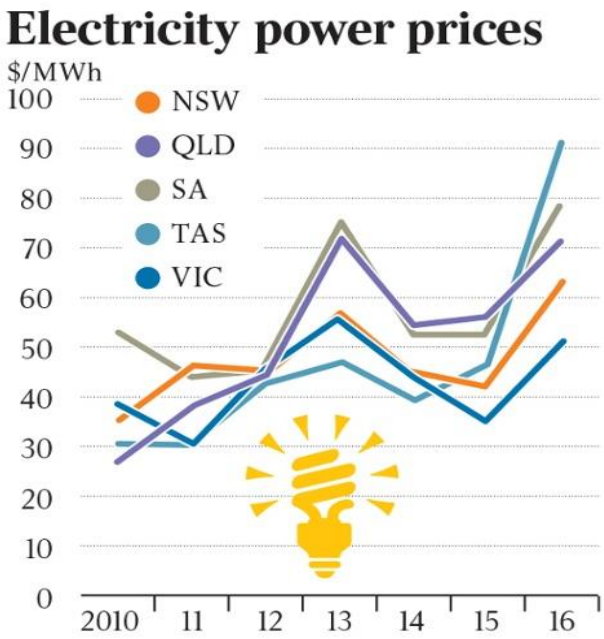
1.1 AFPA urges recognition that internationally competitive energy costs, that reflect Australia's historical comparative advantage and vast domestic energy resources, are essential if manufacturing in Australia is to survive.

Figure 1: National business electricity and gas price increases[1]



[1] Source ABS

Figure 2: Electricity Power Prices by State[2]



2. Forest product industries and climate change benefits

Trees are a sustainable biological resource that produce renewable wood and paper products, including the development of new and innovative products such as biomaterials, biochemicals and bioenergy. They also provide a range of environmental benefits, such as the carbon stored over time in the growing forests and harvested products.

The forest products industry has significant potential to contribute to climate change mitigation in Australia. The major pathways for emissions abatement from the forest products industry include:

- the carbon sequestered in growing forests;
- the carbon stored in harvested wood and paper products;
- the substitution of high emissions materials (e.g. steel, concrete, fossil fuels) with wood and other fibre based products that have low embodied energy, including new bio-products; and
- the use of woody biomass for renewable and baseload energy generation (including for renewable heat and biofuels), thereby displacing fossil fuels.

The significant potential for the forestry and forest products industry to contribute to climate change mitigation was acknowledged in the 4th assessment report of the International Panel on Climate Change, which stated:

> *'A sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation benefit.'*

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[2] AEMO

Two examples help to highlight this significant potential:

1. The current commercial plantation estate contributes an emission offset of around 4.5% of Australia's total emissions of 552 million tonnes (or almost 25 million tonnes per year). According to AFPA calculations[3], the additional planting of a modest 30,000 hectares per year over the next ten years, would capture and store up to 5 million tonnes per annum or an additional 50 million tonnes over that period. This is effectively the equivalent of a '450 million trees program', and would represent by itself more than 5% of the Government's total economy-wide cumulative abatement task to reduce emissions to 26-28% below 2005 levels by 2030.

2. The second area where the industry could play a much larger role is renewable bioenergy, including renewable heat (i.e. process or industrial heating) production and biomass cogeneration. It is conservatively estimated that with the inclusion of renewable heat in an enhanced Renewable Energy Target (RET), the wood and paper industry could deliver new renewable energy generation in the order of 2000-3000 GWh per annum over the next 5 to 10 years.

2.1 AFPA urges that as one of the few land-based and renewable manufacturing sectors that can contribute positively to national climate change objectives, the forest products sector should be actively encouraged and certainly not disadvantaged in terms of the design of future climate change and energy policies and programs.

3. Council of Australian Governments (COAG) process

In December 2016, the Council of Australian Governments (COAG) Energy Council committed to launch an independent review to develop a national reform blueprint to maintain energy security and reliability in the National Energy Market (NEM).

The COAG Energy Council identified a number of key issues that needed to be addressed in the review, including the security, reliability and affordability of the NEM, integrating renewables in the NEM, and securing the market transition to help ensure affordable energy and emissions reductions.

South Australia and Tasmania's recent energy issues have also led to suggestions that Government policy reform and investment in renewable energy (including enhancements to the Renewable Energy Target) should prioritise investment in those sources of renewable energy that can be both dispatchable and better substitute for base-load non-renewable power. This should result in a focus on renewable bioenergy sourced from sustainable biomass in changes to energy policy, renewable energy initiatives and new investments made by Clean Energy Finance Corporation (CEFC), the Australian Renewable Energy Agency (ARENA) and the Government.

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[3] 2016 AFPA policy proposal 'Plantations – the missing piece of the puzzle'

3.1 AFPA supports the following key energy principles detailed in the Preliminary Report of the Independent Review into the Future Security of the National Electricity Market: a focus on energy security, a focus on energy affordability, and a technology neutral approach to achieving an efficient transition to lower emission sources of energy.

4. Electricity market policy reform

There continue to be significant price increases associated with the exercise of generator market power in the NEM. Efforts need to be accelerated to improve competition in the wholesale electricity market, including by increasing penalties and developing rule changes to limit the exercise of generator market power.

Consideration of business cases for interconnector investment need to recognise the positive impact that such investments have on increasing competition between generators, increasing the reliability of energy supply and on electricity spot prices.

Energy policy development and reform has previously focused on electricity generators and distributors with little regard for energy users. However, balanced energy policy reform that considers issues of reliability, affordability and the efficient transition to a lower emissions future requires both sides of the energy market to be given equal consideration. The increased focus in the Preliminary Report on the consumers of energy (not just the suppliers) is appreciated.

4.1 AFPA urges that Government policy reform related to electricity generation should:

i. improve competition in the wholesale electricity market;

ii. business cases for interconnector investment need to recognise the positive impact that such investments have on increasing competition between generators, increasing the reliability of energy supply and on electricity spot prices;

iii. both sides of the energy market to be given equal consideration;

iv. support research into, development and adoption of new generation technologies, including both centralised and decentralised generation; and

v. support and promote improvements in forest product industry energy efficiency, bioenergy generation and storage capacity where appropriate.

5. Energy infrastructure investment

Significant energy infrastructure investment (in both renewable and other generation capacity, and transmission and distribution network infrastructure) has occurred especially over the past decade to deliver ‘accessible and reliable’ energy to Australia.

This has been a huge and costly undertaking resulting in significant increases to delivered energy costs that are (and will continue to be) difficult to absorb by industry and consumers. Certainly, it has removed any previous comparative advantage of low energy costs that were enjoyed by Australian businesses, directly hurting our industries and ongoing competitiveness in global markets.

These increased delivered energy costs are also compounded by the uncertainty of future revenue determinations made for transmission and distribution network companies. This uncertainty has an adverse material effect on investment decisions for energy consumer companies.

Another energy market issue that results in huge uncertainty and cost on annual basis is the (often sizeable) annual variations in network loss determinations for high voltage connected energy consumers. Established high-voltage connected energy consumers can neither influence, nor properly plan for, these variations.

The flow-on impacts of this scale of investment on manufacturing industries – including pulp & paper, engineered wood products, and solid wood products manufacturing – will compound challenges they already face in terms of their international competitiveness (e.g. high currency, resource access), and changing domestic climate change and energy policy. Therefore, it is vital that efforts are made to ensure further investments that are made, are carefully targeted, and needed, to ensure reliable access to energy at the lowest cost. Including minimizing the variability of loss factors along major transmission lines.

AFPA argues that investment in energy transmission networks must be made in the most efficient way possible, without imposing unjustifiable cost burdens on industry and consumers.

5.1 AFPA urges the Government:

- ***i.*** ***to consider reform of the existing rules and policies to ensure that network investment and charges are prudent, necessary and tightly controlled;***
- ***ii.*** ***that the costs of the investments are transparent, justified and affordable;***
- ***iii.*** ***ensure that assets that are not used or not useful are excluded from regulated asset bases, so that electricity networks operators do not pass risks on to end users; and***
- iv. ***ensure that the weighted average cost of capital is regularly reviewed to accurately reflect the cost of finance faced by network operators and their monopoly position***

6. Gas shortage and price pressures

Gas supplies are tightening, resulting in rising gas prices which will have an adverse impact of on the competitiveness of the manufacturing sector including wood and paper processing.
Manufacturing costs in Australia often are at the higher end of global benchmarks, factoring in safety and environmental standards, labour conditions and energy costs. As large users of energy, rising gas prices are having an additional adverse impact on the input costs of manufacturing sectors such as wood and paper products.

The Australian gas market is undergoing significant change:

- On the East Coast, gas prices are rising because of the development of Liquid Natural Gas (LNG) facilities in Queensland and growth in LNG exports. Gas supply is tight and domestic contracting very challenging, primarily because of uncertainty about the ability of Coal Seam Gas (CSG) developments to achieve the ramp up required to meet LNG export commitments.
- On the West Coast, gas prices are also expected to rise strongly as previous long-term North West Shelf contracts expire.
- Both Victoria and NSW currently have moratoriums on unconventional gas development constraining potential supply increases.

Modelling by Deloitte Access Economics suggests up to $118bn in lost output by 2021 to the Australian manufacturing sector based on forecast gas price rises.

6.1 AFPA supports:

i. ***gas industry policy and regulatory reform to promote low cost and efficient gas supply, including greater diversity and efficiency in supply (based on science and good environmental practice); and***

ii. ***greater transparency in pricing decisions by gas producers and retailers.***

7. Bioenergy - a part of the renewable solution

There is disappointingly no reference to 'bioenergy' in the Preliminary Report, and the single reference to 'biomass' groups it with fossil fuel in the context of carbon capture and storage (CCS). Bioenergy should rather be categorised to have zero net greenhouse gas (GHG) emissions and grouped with other forms of renewable energy, as recognised under the Kyoto Protocol.

Bioenergy produced from sustainable biomass is renewable. Under the Kyoto Protocol, bioenergy is regarded as CO_2 neutral. The United Nations Framework Convention on Climate Change also defines bioenergy as renewable, if it is produced from biomass that is sustainably managed. Australian governments recognise it as an eligible renewable source under the current Renewable Energy Target, and other renewable energy and climate change policies and initiatives.

The Clean Energy Finance Corporation (CEFC) recognises the significant potential for bioenergy to contribute to renewable energy, biofuels and carbon emissions, creating the $100 million Australian Bioenergy Fund[4] to invest in bioenergy and waste to energy projects. As at June 2015, the Australian Renewable Energy Agency (ARENA)[5] had invested over $7.6 million in bioenergy projects and wants to invest more in this renewable.

Bioenergy produced from sustainable woody biomass is "carbon neutral" over its life cycle because combustion of biomass releases the same amount of CO_2 as was captured by the plant during its growth. This is a natural part of the carbon cycle with sustainable woody biomass obtained from wood processing activities (such as sawdust, timber offcuts) and forestry waste and residues. Bioenergy from sustainable woody biomass is part of making the most use from materials sourced during forest harvesting and the production of wood, paper or bio-based products (which can continue to store carbon long term).

By contrast, fossil fuels release CO_2 that has been locked up for millions of years. **Attachment 1** further details the accepted life cycle assessment principles underpinning carbon-neutrality of renewable bioenergy produced from sustainable woody biomass.

The Clean Energy Finance Corporation (CEFC) noted that *renewable bioenergy is very cost competitive where the feedstock is available at low cost or as revenue source, at large scale and where cogeneration of heat offers opportunities to reduce other costs*.[6]

As an alternate base-load energy and the world's largest renewable energy source, bioenergy sourced from sustainable biomass (including recognition of renewable industrial heat) has significant potential to help achieve many of the goals identified by the COAG Energy Council. Our industries could make a significant contribution to delivering lower emissions and affordable reliable renewable energy security, while also providing much needed investment and regional jobs in forestry, wood and paper product manufacturing.

Large scale renewable cogeneration investments based at integrated forest product manufacturing sites will result in positive benefits to both the grid's baseload capabilities and as embedded generation assets. These sites are often based in rural and regional areas and will have additional positive benefits for transmission and distribution network requirements.

Bioenergy is a unique renewable source that can be used across all three energy sectors (transport, heat and electricity). Although biomass is included as an eligible source under the RET to produce renewable bioelectricity only, currently bioenergy sourced from renewable biomass is being overlooked in energy policy development.

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4 https://www.cleanenergyfinancecorp.com.au/media/158193/cefc-factsheet_australian-bioenergy-fund_lr.pdf

5 https://arena.gov.au/funding/investment-focus-areas/bioenergy/

6 2016 CEFC http://www.cleanenergyfinancecorp.com.au/media/222701/cefc-energy-from-waste-market-report-november-2016.pdf

A recent report from climate change and energy advisory firm, Energetics[7], shows the significant challenge of implementing enough new utility-scale wind and solar projects to meet the existing renewable energy target of 33,000 gigawatt hours by 2020. The graph in **Attachment 2** shows how a significant acceleration in the construction of renewable energy projects is needed if the 2020 RET is to be met. Clearly, other renewable energy options should also be explored if the target is to be achieved.

The CEFC also noted that Australia lags most of the world when it comes to renewable bioenergy and identified the potential for bioenergy output to double in Australia over the next five years. Their 2016 report identifies up to 800 MW of new generation opportunities from bioenergy by 2020. Its analysis shows that bioenergy can be a minor, but vitally important part of Australia's energy mix into the future, drawing on sustainable biomass and waste resources such as forest products processing waste and forestry residues.

The CEFC report indicates the potential for the bioenergy sector to contribute to clean energy, biofuels and carbon emissions reduction. However, as of 30 June 2015, the CEFC has provided just $80 million in funding for bioenergy projects, compared with $259 million for wind and $395 million for solar PV.[8]

Other countries are approaching the achievement of ambitious climate targets by incentivising their businesses to transfer from coal, oil and gas heating to heating from renewable biomass sources (i.e. from forestry residues or other sources, such as sugarcane bagasse and slash).

Globally, energy sourced from biomass accounts for around 77% of renewable energy, which represents 13% of the world's primary energy mix[9]. The International Energy Agency[10] estimates that bioenergy could provide 7.5% of world electricity generation by the year 2050, and heat from bioenergy could provide 15% of global final energy consumption in industry and 20% in the building sector.

However, despite having the highest area of forest per capita of the developed nations, in 2015 bioenergy only contributed 9.1% of total renewable energy and 1.3% of total electricity generated in Australia[11]. In contrast, bioenergy contributes more than 24% of the total energy consumption in Finland, more than 22% of total energy consumption in Sweden and more than 17% of total energy consumption in Denmark.

[7] Source: Energetics Report prepared for FWPA PRA399-1516 'Industrial heat credits and the Renewable Energy Target' – April 2016

[8] Source: Energetics Report prepared for FWPA PRA399-1516 'Industrial heat credits and the Renewable Energy Target' – April 2016

[9] International Energy Agency (IEA) (2009). Bioenergy – a Sustainable and Reliable Energy Source, Main Report. IEA Bioenergy: ExCo 2009-06.

[10] https://www.iea.org/publications/freepublications/publication/IEA_Bioenergy_Roadmap_FoldOut_2ndEdition_WEB.pdf

[11] https://www.cleanenergycouncil.org.au/policy-advocacy/reports/clean-energy-australia-report.html

Currently, the Australian forest products industry produces a large amount of biomass waste and residue from harvesting and timber processing operations. However, only some of this material is being utilised in local or regional bioenergy facilities, or converted into biopellets that are currently exported overseas as a source of renewable energy, the remaining residues and waste ultimately ends up emitting CO_2 from natural degradation. This export market potential also demonstrates the imbalance in renewable energy policy settings, whereby markets in many countries in Europe and Japan, for example, can offer better prices for sustainable biomass given their more favorable renewable energy policies.

Uniquely, bioenergy can deliver baseload power 24 hours a day, 7 days a week, unlike many alternative renewables. Bioenergy can also support greater jobs (most regionally based and part of a broader productive supply chain) compared to other renewables, and it is well suited to many existing wood and paper processing sites in rural and regional areas.

The advantages of bioenergy include:

- the reduction of CO_2 emissions via the substitution of bioenergy for fossil fuels;
- both the security and flexibility of this renewable energy source (on-demand and can be used as base load);
- production energy co-products (i.e. electricity, heat and liquid fuels);
- potentially regionally based (decreased transmission loss and reduced need for costly transmission infrastructure);
- management of waste and residue streams;
- besides greenhouse gas abatement, sustainable woody biomass can provide multiple environment co-benefits including combating dryland salinity, mitigating soil erosion, and improving water quality to name a few; and
- provide regional employment and development, especially through new rural industries.

7.1 The Government should promote renewable bioenergy in energy policy reform as part of Australia's overall energy mix.

7.2 Further, renewable bioenergy from woody biomass should be promoted given its links to climate change policy and multiple abatement pathways, and the concept of cascading mitigation benefits from the use of wood and paper products, and bioenergy at the end of their useful lifecycle[12].

7.3 Policy development needs to be flexible to support a potentially broad range of bioenergy based opportunities from small co-generation facilities located in small regional areas to large facilities located in the capital cities.

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12 United Nations Economic Commission for Europe/Food and Agriculture Organisation (UNECE/FAO), Proceedings of the Workshop on Harvested Wood Products in the Context of Climate Change Policies, 9-10 September 2008, United Nations Palais des Nations, Geneva, Switzerland.

AFPA is also an active member of Bioenergy Australia. Bioenergy Australia is the vehicle for Australia's participation in the International Energy Agency's Bioenergy Technology Collaboration Program (www.ieabioenergy.com). Bioenergy Australia is currently participating in the following five IEA Bioenergy Tasks:

- *Task 37 - Energy from Biogas.*
- *Task 38 - Climate Change Effects of Biomass and Bioenergy Systems.*
- *Task 39 - Commercialisation of Conventional and Advanced Liquid Biofuels from Biomass.*
- *Task 42 - Biorefining in a Future Bioeconomy.*
- *Task 43 - Biomass Feedstocks for Energy Markets.*

This participation is giving access to world's best practice in many bioenergy related technologies and exposing the Australian bioenergy industry to the latest international developments in bioenergy. Two recent reports from IEA Bioenergy, '*The status of large-scale biomass firing' (88 pages)* and '*Bioenergy's role in balancing the electricity grid and providing storage options-an EU perspective' (63 pages)* would be relevant to the work of the Review Panel. Another IEA Bioenergy report aimed at policy makers is '*Bioenergy – a sustainable and reliable energy source' (108 pages)*. These are all free downloads from www.ieabioenergy.com.

A key input into renewable bioenergy is the cost and availability of the sustainable biomass. In recognition of the future importance of bioenergy and biomass in Australia, a consortium of State government associated organisations, led by the Rural Industries Research and Development Corporation is currently conducting a $6.3 million project, the Australian Biomass for Bioenergy Assessment[13], co-funded by ARENA to quantify national biomass resources. This project's intent is to provide data for a national renewable bioenergy atlas to support future renewable bioenergy projects. Consolidated biomass resources that are being considered would include the significant and integrated forestry resource in Western Victoria, South East South Australia and Tasmania, which could play a strong role in improving base load bioenergy security for South Australia and Tasmania.

8. Recognition of renewable heat component in energy including enhancing the RET

A major impediment to the uptake of renewable bioenergy in Australia is the emphasis on bioelectricity in the RET. This has constrained bioenergy investment in renewable heat and cogeneration opportunities. The lack of incentives for the use of sustainable biomass creates a serious imbalance in the renewable energy market, and misses some of the lowest cost opportunities for carbon emissions abatement.

In September 2015, the Government and the Australian Labor Party agreed on a bipartisan target of 33,000 GWh by 2020 under the RET. While woody biomass waste and residues are accepted in the RET as eligible sources for the generation of bioelectricity only, in many

[13] https://arena.gov.au/project/the-australian-biomass-for-bioenergy-assessment-project/

potential bioenergy investments renewable heat is a large component of the project's required energy need and output.

In their report Energetics also found that Australia is well outside the international climate and renewable energy policy mainstream by failing to recognise the renewable industrial heat component in the RET. The existing inclusion of small-scale solar hot water heaters in the RET illustrates that the policy does not in-principle preclude the recognition of renewable industrial heat.

The emphasis on bioelectricity in the RET has constrained large scale investment in the primary production of renewable heat energy (e.g. conversion of boilers away from fossil fuel sources to biomass) as well as cogeneration in wood processing (e.g. sawmilling) and paper products manufacturing industry. This is largely a function of the large capital costs involved and the need for an adequate incentive for new investment, as in the case with solar and wind.

This in contrast to Europe and many other countries that recognise renewable heat as a key part of their climate change policies. The use of renewable heat is also actively promoted in Scandinavia, the EU and many other parts of the world as an effective means for reducing fossil fuel reliance – and having the flexibility of both baseload and dispatchable power generation.

For example, the UK government identified that it had a huge carbon emissions source from heat energy generated from non-renewable fossil fuels. To address this, the UK government in November 2011 developed an environmental program called the '**Renewable Heat Incentive (RHI)**' with domestic (e.g. domestic homes) and non-domestic (e.g. commercial and industrial) components.

The RHI provides financial incentives to increase the uptake of renewable heat via an incentive, payable for 20 years, to eligible renewable heat generators and producers of bio-methane. Eligible installations receive quarterly payments over 20 years based on the amount of renewable heat generated. The RHI scheme covers England, Scotland, and Wales, and is administered by the official regulator Ofgem who pays the tariffs with money directly sourced from the Treasury.

At the end of 2015, it was reported that the RHI had already supported over 50,000 homes and businesses to make the switch to renewable heat (i.e. up to 2.2 GW of installed renewable heat capacity). Over 94% of the installed capacity was solid renewable biomass boilers.

Australia's wood and paper product industries use heat energy for a wide variety of applications, including drying, preheating, and process heating (e.g. steam for process drying in papermaking, reconstituted timber manufacturing or sawmilling). The significant size and scale of heat energy use represents a unique opportunity for renewable generation. Industrial facilities often take advantage of co-location, waste centralisation and cogeneration.

Cogeneration, for example, is a highly efficient form of energy generation through combined heat and power (CHP) production. This is because much of the energy that is usually wasted to the atmosphere in a conventional power station can be usefully converted to heat for an industrial or other process in a cogeneration facility. There are powerful synergies when cogeneration and renewables work together[14].

8.1 The Government could also achieve ambitious emissions reduction targets and underpin significant new investment by both supporting renewable bioenergy, and recognising the renewable industrial heat component in an enhanced RET and other policy mechanisms.

Recognition of renewable heat energy from industrial processes could potentially:

- generate new investment in several thousand GWh of renewable energy per annum in the wood and paper products sector over the next decade (obviously much more if other industries are counted);
- be a significant game changer in improving the international competitiveness of a number of large manufacturing based businesses; and
- help to strengthen (by providing baseload renewable generation) and diversify the renewable energy mix at lower cost.

A broad range of renewable heat projects should be supported including: standalone, cogeneration, new greenfield facilities, existing facilities converting to renewable, and investments in energy efficient upgrades to existing facilities. AFPA is aware of a pipeline of potential industry projects including conversion of boilers to renewable biomass for drying of green timber products, board production and paper manufacturing.

9. Technical advantages of producing bioenergy (baseload, dispatchable and co-firing opportunities)

In the electricity sector, bioenergy offers both baseload and dispatchable power generation using high inertia synchronous generators with obvious benefits for managing the wider electricity system.

[14] Source: International Energy Agency (IEA) 2011. Co-generation and renewables: solutions for a low-carbon future, France. Available at: http://www.iea.org/publications/freepublications/publication/co-generation-and-renewables-solutions-for-a-low-carbon-energy-future.html

In the heat sector, bioenergy allows the generation of both high grade and low grade (in the case of cogeneration) heat that cannot be easily achieved through other low carbon sources.

In transport applications, bioenergy offers opportunities alongside other very low emission vehicles powered by batteries and hydrogen fuel cells and is particularly valuable for decarbonising areas such as aviation and heavy good vehicles where there are fewer alternatives to liquid fuels.

The coupling of microgrid technology and renewable bioenergy especially associated with regionally based wood and paper product processing facilities is also worthy of consideration in the development of a more flexible, reliable and secure national electricity market blueprint, as they integrate well with renewable energy sources such as combined heat and power (CHP) systems. While it may make sense for some industrial facilities and even towns at the edge of the grid to become self-sufficient and disconnect entirely, it is suggested that micro-grids could also remain connected to the network, helping to reshape a more centralised grid to one that incorporates decentralised renewable power generation sources and storage. Biomass can also replace diesel based generation in many micro-grid situations (unlike intermittent renewables). Diesel like gas is expensive (increasingly so) and adds to atmospheric carbon.

Worldwide, combustion already provides over 90% of the renewable energy generated from sustainable biomass[15]. Combustion technologies are commercially available and can be integrated with existing infrastructure. One useful example in an Australian context is 'cofiring' sustainable biomass in existing coal-fired energy generators. Cofiring with a renewable input (sustainable biomass or renewable biopellets produced from sustainable biomass) has the potential to significantly reduce the carbon footprint of these non-renewable electricity generators while supporting baseload generation, regional employment and communities.

IEA Bioenergy concluded on cofiring that:

- Cofiring has been demonstrated successfully in over 150 installations worldwide for most combinations of fuels and boiler types.
- Cofiring offers among the highest electrical conversion efficiencies of any biomass power option.
- Cofiring biomass residues in existing coal-fired boilers is among the lowest cost biomass power production options.
- Well-managed cofiring projects involve low technical risk.
- In addition to mitigation of CO_2 emission, cofiring biomass in existing coal-fired boilers usually also leads to reduced emissions of NO_x, SO_2 and other flue gas components.

[15] IEA Bioenergy Task 32. http://www.ieabcc.nl/

A recent example of conversion from coal to bioenergy of large scale existing power plants has occurred in Canadian towns of Atikokan (2014) and Thunder Bay[16]. These two towns were identified by Ontario Power Generation (OPG) as strong candidates for conversion to bioenergy. A 2010 study commissioned by OPG and conducted by the Pembina Institute further reinforced the concept, identifying the conversions as both economically and socially viable. The study found the conversions would create 130 jobs in the forestry and pellet production sectors, and that burning wood-based biomass fuel would produce 80 per cent fewer greenhouse gas emissions than natural gas generation.

9.1 AFPA urges recognition in energy policy reform of bioenergy's potential to provide baseload, dispatchable and cofiring renewable energy opportunities.

10. Bioenergy's potential role in balancing the grid and providing storage options.

Bioenergy can contribute to balancing the electricity grid. It is also one form of renewable energy storage. So far little attention has been paid to the possible role of bioenergy as an effective, carbon-neutral, and low cost grid management and energy storage option.[17]

Energy demand fluctuations over the seasons are one of the key challenges for energy system management. For example, solar power production goes down dramatically in winter time while electricity consumption grows. The backup need in winter time also coincides with increased heat demand, which is a perfect fit with combined heat and power. This shows positive synergy in seasonal balancing between solar and bioenergy. In addition, bioenergy co-firing, power and combined heat power and cooling (CHP-C) systems can potential add synchronous generators to the grid which is a stabilizing factor.

Bioenergy plants are dispatchable and can be operated in a similar way to conventional (fossil fuel) installations. This can happen through the thermo and bio-chemical conversion of the renewable feedstock into storable energy products, either gaseous, liquid or solid, adding flexibility to its use.

Bioenergy is largely used for residential and industrial heat production and for CHP (combined heat and power). ***A range of possible technical options exist to balance and support the grid with sustainable biomass. The use of sustainable biomass to replace fossil fuel based power generation in balancing can create economic, environmental and security of supply related benefits.*** The potential for balancing the grid will vary between regions, mainly due to differences in the availability of biomass, existing infrastructure (such as the gas network), and the degree of grid interconnectivity.

[16] http://www.opg.com/about/environment/documents/opgbiomassconversion.pdf

[17] http://www.ieabioenergy.com/wp-content/uploads/2017/02/IEA-Bioenergy-bio-in-balancing-grid_master-FINAL.pdf

There are emerging biomass conversion technologies that can provide storable fuels which could also be used for balancing (i.e. biopellets, cellulosic ethanol and diesel-replacement type fuels such as biomethane). In the future, new technologies and/or value chains are expected to come to the global market, some with a more dedicated approach to balancing (such as transforming low demand electricity to hydrogen which could be used in biofuel production).

10.1 AFPA urges consideration in energy policy reform of the potential of sustainable biomass technology to balance the grid and provide renewable energy storage options.

11. Conclusion

AFPA urges the Australian Government to consider the potential of bioenergy sourced from renewable biomass, with the aim of developing a national electricity market reform blueprint that enables the upcoming transition to secure both affordable energy and the benefits of renewables.

AFPA supports renewable energy policies that:

- **promote renewable energy opportunities for bioenergy, including for renewable electricity, industrial heat and biofuels;**
- **support plantation and native forestry harvesting and processing residues from sustainably managed operations as renewable energy sources which must be provided the same opportunity for renewable energy credits (or any other policy instrument) as hydro, wind and solar;**
- **support greater utilisation of biomass to energy systems; and**
- **provide a level playing field for bioenergy with respect to other clean technology (and funding) sources, such as wind and solar.**

Any further queries on this submission please contact AFPA on (02) 6285 3833.

ATTACHMENT 1: Carbon neutrality of sustainably produced woody biomass

Renewable bioenergy is energy derived from sustainable biomass[18]. Sustainable biomass can be produced as a byproduct of forestry, sawmilling and agriculture activities, that also produce integrated renewable and recyclable wood and paper products. Biomass can be utilised directly for heat energy or converted into gas, electricity or liquid fuels. There is a vital difference between energy production from fossil fuels and from biomass. Burning fossil fuels releases CO_2 that has been locked up for millions of years. Biomass use for energy generation is considered “carbon neutral” over its life cycle because burning biomass simply returns to the atmosphere the CO_2 that was absorbed as the plants grew and there is no net release of CO_2 if the cycle of growth and harvest is sustained (***see Figure 1***).

In energy and climate change policy reform the full life cycle benefits of sustainable biomass should be recognised from the carbon stored in trees to harvested wood and paper products to renewable bioenergy to recycling. Adopting full life-cycle assessment principles will take advantage of wood’s very low embodied energy and recognise the significant substitution advantages over other materials.

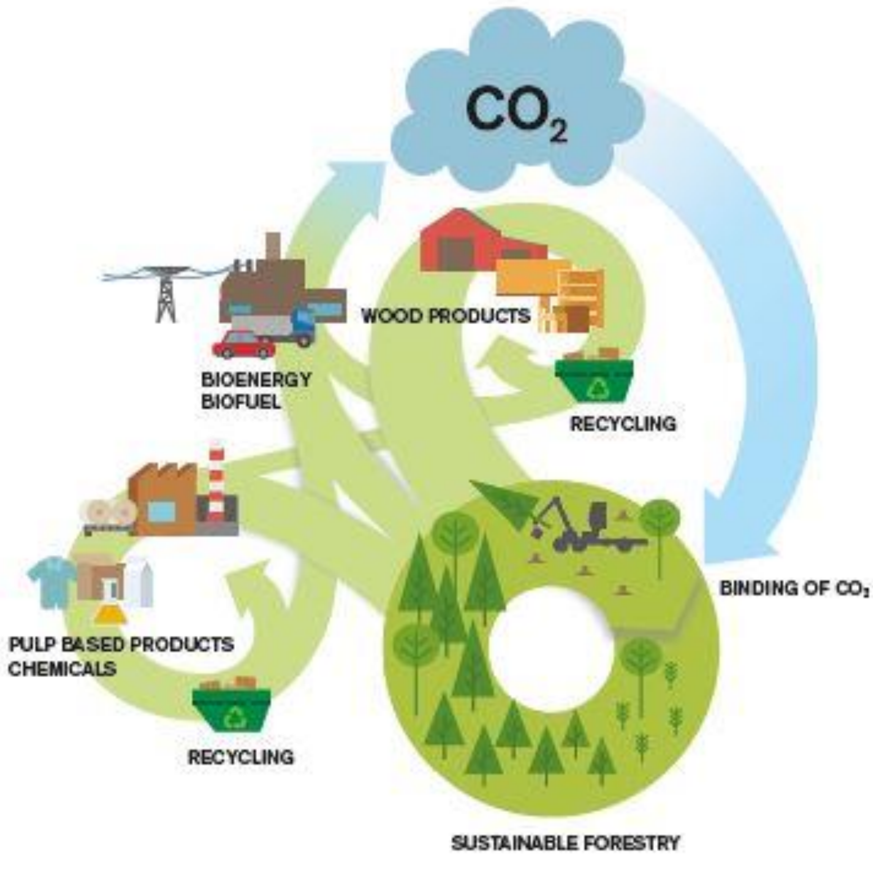

Figure 1. When forest biomass is used to produce pulp, paper and other wood products, bioenergy is produced simultaneously. Biomass from forestry operations and byproducts from wood processing are used to make electricity, heat and fuels. This bioenergy is used to meet internal process energy needs in the forest industry and is also used outside the forest industry. Figure: Sveaskog.

18 IEA Bioenergy Task 38. http://www.task38.org/task38faq.pdf

The energy bound into the biomass can be recovered through the variety of bioenergy processes and technologies. During the energy recovery process, the CO_2 bound in the biomass is released to the atmosphere. Bioenergy is regarded as renewable, when the biomass resource consumed in the energy conversion process is replenished by the growth of an equivalent amount of biomass. Under the Kyoto Protocol, bioenergy is regarded as CO_2 neutral. The United Nations Framework Convention on Climate Change[19] also defines bioenergy as renewable, if it is produced from biomass that is sustainably managed.

Apart from being highly regulated, there has been a huge uptake of voluntary forest management certification schemes to demonstrate the environmental and sustainability credentials of Australian forest management activities. The two major internationally recognised voluntary certification schemes are the Forest Stewardship Council (FSC) and the Programme for Endorsement of Forest Certification Schemes (PEFC) via the Australian Forestry Standard (AFS).

Fossil fuel sourced energy is usually consumed in producing bioenergy, but research shows that usually the energy used is a small fraction of the energy produced. Typical energy balances for relevant forestry and agriculture systems indicate that roughly 25 to 50 units of bioenergy are produced for every 1 unit of fossil energy consumed in production[20]. Net carbon emissions from generation of a unit of electricity from bioenergy are 10 to 20 times lower than emissions from fossil fuel-based electricity generation[21]. Bioenergy can also reduce carbon emissions by offsetting emissions intensive grid electricity, which typically is associated with emissions of 0.9 t CO2 – e/MWh and by avoiding direct methane emissions from decomposing biomass.[22]

Additionally, integrated renewable and recyclable wood and paper products store carbon and can act as a carbon sink. Wood products also have a far more significant role to play by replacing more energy-intensive materials such as steel and concrete. For example, maximizing the use of wood products in constructing new buildings can cut emissions of greenhouse gases due to the manufacture of building materials by between 30 % and 85 % [23]. That is a major contribution to emissions reduction from integrated renewable and recyclable wood and paper products is through replacement of other materials or fossil fuels, rather than just through the physical retention of carbon within the wood.

[19] https://cdm.unfccc.int/EB/023/eb23_repan18.pdf

[20] Börjesson, 1996; Boman and Turnbull, 1997; McLaughlin and Walsh, 1998; Matthews, 2001; Elsayed et al., 2003

[21] Boman and Turnbull, 1997; Mann and Spath, 2000; Elsayed et al., 2003

[22] 2016 CEFC http://www.cleanenergyfinancecorp.com.au/media/222701/cefc-energy-from-waste-market-report-november-2016.pdf

[23] Buchanan and Honey, 1995 for example

ATTACHMENT 2: Installed capacity required to maintain REC market liquidity.

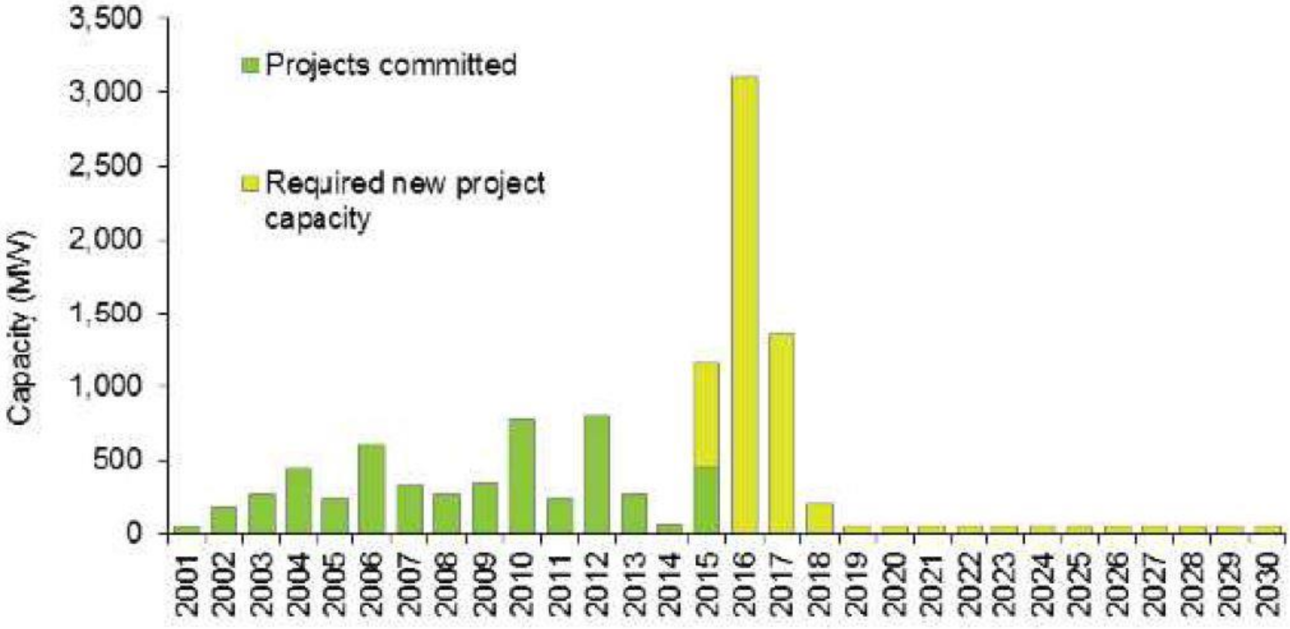

Figure 2: Installed capacity required to maintain REC market liquidity[13]

Source: Energetics Report prepared for Forest and Wood Products Australia PRA399-1516 'Industrial heat credits and the Renewable Energy Target' – April 2016 and Green Energy Markets reported in "Renewables target needs 3,800MW of large scale renewables within 12 months", RenewEconomy, 16 October 2015.[24]

[24] www.fwpa.com.au/rd-and-e/market-access/1018-industrial-heat-credits-and-the-renewable-energy-target-pra399-1516.html