Forest&Wood Products Australia
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RESOURCES

PROJECT NUMBER: PRA399-1516

April 2016

# Industrial heat credits and the Renewable Energy Target

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# Industrial heat credits and the Renewable Energy Target

Prepared for

**Forest & Wood Products Australia**

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# Publication: Industrial heat credits and the Renewable Energy Target

**Project No: PRA399-1516**

This work is supported by funding provided to FWPA by the Department of Agriculture, Fisheries and Forestry (DAFF).



ISBN: 978-1-925213-41-6

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**Final report received by FWPA in April, 2016.**

# Executive Summary

Stakeholders in the forest products industries believe that the inclusion of heat credits in the Renewable Energy Target (RET) can contribute to the cost effective decarbonisation of energy in Australia, promote the use of sustainable forest resources and support Australian forest industries.

This report looks at the role that renewable heat credits could play in both the current RET of 33 TWh in 2020 and modelled scenario of 66 TWh of renewable electricity in 2030. Note that the Australian Government has no current proposal to expand the RET. There are differing views in the market as to whether the current uncertain investment climate for utility scale renewable generators will see sufficient projects implemented prior to 2020[1].

Certainly, for the modelled 2030 RET of 66 TWh, there are insufficient approved or planned wind and solar projects in the states covered by the NEM. Projections by the then Bureau of Resource and Energy Economics (BREE) and Geoscience Australia support this assertion, although the existence of an expanded RET may promote further project development.

The role of biomass for heat generation outside of Australia is clear. The Australian forest products industry can point to Europe in particular as leading the way in utilising wood waste for the creation of wood waste heat certificates. Biomass for electricity generation, heating and cooling is estimated to contribute 45% of the EU renewable energy target. In 2012, the European bioheat and bioelectricity sectors generated 1,046 TWh of electricity had a total turnover of €33 billion and employed over 374,800 people. By contrast the Australian bioenergy sector employed 2,500 people and contributed just 2.4 TWh of electricity.

The inclusion of industrial heat within the RET is consistent with the stated aims of the RET "*to encourage the additional generation of electricity from renewable sources*" and "*to reduce emissions of greenhouse gases in the electricity sector*". It will do this by encouraging cogeneration at the source of the wood waste. A policy gap is identified with no adequate measures to support heat generation from biomass in Australia. Clearly there is international precedence for the inclusion of large scale heat credits from biomass across numerous jurisdictions including US, UK, Sweden, Norway, Finland, France and Italy.

The Clean Energy Finance Corporation (CEFC) noted that bioenergy and energy from waste technologies have a long track record of cost-effectively reducing carbon emissions. Yet these technologies are not widely deployed in Australia. Only 0.9% of electricity in Australia is sourced from bioenergy compared to 2.4% across the OECD. The CEFC sees significant opportunities for investment in bioenergy in Australia including in energy from plantation forest residues. They estimate that the Australian bioenergy and energy from waste investment opportunity to 2020 is between $3.5 billion and $5 billion.

[1] Note that a sufficient number of utility scale renewable energy projects to meet the 2020 RET have been approved by planning consent authorities, but not committed by investors.

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# Report

## 1. Introduction

The decarbonisation of energy in Australia is driven by the Renewable Energy Target (RET). The RET sets a target for the volume of electricity that must be sourced from approved renewable sources. Following a review and subsequent changes to the supporting legislation, the RET currently has a large scale generation target of 33 TWh in 2020[2,3]. Significantly, the RET does not cover heat generated from renewable sources. Stakeholders from the Australian forest industries believe that inclusion of heat credits in the RET can contribute to the cost effective decarbonisation of energy use, promote the use of sustainable forest resources and support Australia's forest industries.

This report looks at the role that renewable heat credits could play in the RET. It considers two scenarios. The first is the current target of 33 TWh of renewable electricity by 2020. The study then considers the period out to 2030, which incorporates the second scenario for the RET.

Australia has proposed an emissions target for 2030 that will correspond to a reduction in emissions of 26% to 28% relative to 2005. Realising this target is expected to require a number of policy instruments. The existing suite of policies includes the National Energy Productivity Plan, the Emissions Reduction Fund, the Safeguard Mechanism and the RET. A review of the policy suite is proposed for 2017. We expect the appropriate RET for 2030 will also be considered at this time. With this in mind, the study of renewable heat credits will also consider a target of 66 TWh by 2030.

### 1.1. Report structure

This report begins with our assessment of the contribution of heat credits to the RET. This is informed by the planned increases in utility scale renewable energy generation projects in Australia out to 2030 and the anticipated constraints on rapid investment in utility scale renewables. We then assess the value of renewable industrial heat credits in contributing to the cost effective realisation of the RET including addressing shortfalls in large scale generation certificates (LGCs).

Energetics then outlines the use of heat credits in other jurisdictions, seeking precedents that could inform the debate in Australia.

Finally, the report describes the likely impact that a revised treatment of renewable heat credits could have on Australia's forest industries.

### 1.2. The role of renewable energy in Australia's abatement task

The major outcome of the Paris Agreement in December 2015 was the declared support of all 195 signatory nations to set a path to limit warming to 2°C. Australia's nationally determined commitment to reduce emissions from 2005 levels by 26-28% by 2030 will require large-scale emissions reductions across all areas of the economy, including decarbonisation of Australia's electricity generation sector.

[2] http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target

[3] Electricity from small scale renewable sources is treated separately in the RET.

The National Energy Productivity Plan calls for a 40% improvement in energy productivity[4] by 2030. Yet even a 100% increase (i.e. doubling) in energy productivity by 2030 based on the 2010 baseline can only hold primary energy use constant over the same period.[5] The scale of abatement needed to meet the 26-28% emissions reduction target will require increased penetration of renewable energy in the Australian stationary energy sector if Australia is not to rely solely on measures such as reafforestation and purchase of international offsets to meet the abatement target.

For instance, Energetics' modelling suggests that a RET of 66 TWh in 2030 versus the current 33 TWh will reduce national emissions in the absence of other actions by 29.6 Mt $CO_2$-e in 2030. Should this volume of emissions be offset through Australian Carbon Credit Units (ACCU) purchased at $13 per unit using seven year contracts, then the cost to the Commonwealth via the Emissions Reduction Fund or liable entities under the Safeguard Mechanism is the order of $2.9 billion.

## 1.3. Scope of work – the focus on plantation forestry

The scope of this report is limited to the consideration of the potential of plantation forestry as a feedstock. About half Australia's plantation forestry area is exotic softwood species; the other half is mostly native hardwood species[6]. To this end native forest operations have been excluded from consideration. Australia's native forests are classified nationally into woodland forest, open forest and closed forest, according to existing or potential crown cover. Plantation forestry in Australia has seen periods of growth over the last 20 years. As of 2015, Australia's production forest estate was 9.4 million hectares consisting of 7.5 million hectares of native forests and 1.9 million hectares of plantation forests. In comparison, Australia has a total of 122 million hectares of native forest.

[4] Energy productivity is the ratio between the dollar value of production and the quantity of energy expended to achieve that production.

[5] "Energy Productivity and Emissions Reduction - How Can Energy Productivity Help?", Gordon Weiss, 2016 Australian Summer Study on Energy Productivity, February 2016.

[6] "Australia's forests at a glance 2015", Department of Agriculture and Water Resources, 2015

# 2. The capacity of wind and solar to meet the RET

This section of the report considers the ability of utility scale wind and solar generation to deliver the necessary renewable energy to meet the current and future renewable energy targets. We show that proposed new utility scale wind and solar projects may not be available for the 33 TWh target to be met in 2020. Further, we show that additional investments in utility scale wind and solar will be required if the expanded RETs in 2025 and 2030 are to be delivered solely through utility scale wind and solar generators.

## 2.1. Meeting the 2020 target

In 2015 the Clean Energy Regulator, which administers the RET, reported 99.7% compliance, with 18,793 LGCs acquitted. Based on this compliance rate, we can assume that there is sufficient renewable generation in the National Electricity Market (NEM) to deliver 18.8 TWh of electricity. In order to meet the 2020 target, the NEM will need to expand to include an additional 15.2 TWh of renewable generation. Based on the weighted average capacity factor (refer to Box 1 below), the total installed capacity required to deliver over 15 TWh in renewable generation is 4.88 GW.

Views on whether the market will be able to deliver the requisite capacity are mixed. Origin believes that sufficient wind projects have received DA approval for 5 GW of new wind capacity to be installed, and this is enough to meet the 33 TWh requirement. This is largely due to Origin's stated position that it is more economic to invest in new build capacity than for the market to pay the shortfall penalty, prior to 2020.

Similarly Ernst & Young (EY) also estimate that the RET will be met through a combination of wind with a smaller contribution of large-scale solar.[7] EY estimated 5000 MW in new capacity required to meet the RET will need $12 billion investment, but will be manageable through the predicted surge in renewable energy investment, which reached $830 million in 2015.[8] EY estimates that around 10,000 MW of wind projects could be deployed relatively quickly.

Conversely Green Energy Markets predicts that the RET will not be met due to the current low rate of investment. Just 8.5 MW of renewable projects were accredited in the fourth quarter of 2015, for a total of 19 small schemes.[7] So while there are sufficient 'shovel ready' wind and solar projects available to meet the 2020 RET, the investment uncertainty in the near term may result in a shortfall in renewable energy.

The Australian Energy Market Operator (AEMO) maintains a database of planned or announced renewable energy projects in the jurisdictions covered by the NEM[9]. In total this database has recorded a total of 13.3 GW of capacity.[10] However, of this, only 2.5 GW of renewable capacity have indicative start dates prior to 2020. The timing of the remainder of the capacity has yet to be finalised.

[7] http://www.energybusinessnews.com.au/business/regulation-policy/australia-to-miss-2020-ret-says-research-firm/

[8] http://www.ey.com/Publication/vwLUAssets/EY-power-transactions-and-trends-q4-2015/$FILE/EY-power-transactions-and-trends-q4-2015.pdf

[9] The AEMO database does not include planned projects in WA.

[10] http://www.aemo.com.au/Electricity/Planning/Related-Information/Generation-Information

Table 1 and Figure 41 provide an overview of total installed renewable capacity projected for start-up in the years up to and including 2020, as well as the capacity of all listed projects. The table shows that the total capacity of projects currently planned or announced is sufficient to meet the 2020 target of 33 TWh. However, as 2.5 GW of this planned capacity has current start dates prior to 2020, the ability to meet the 2020 target will be driven by the market's ability to generate the investment needed to bring planned projects online earlier.

**Table 1: Planned or announced renewable energy projects**

| Renewable energy source | Capacity of 2020 projects (MW) | Capacity of all projects (MW) |
|---|---|---|
| Biomass | 8 | 22 |
| Solar | 86 | 1,309 |
| Wind | 2,434 | 11,649 |
| Marine | 0 | 336 |
| **Total** | **2,528** | **13,316** |

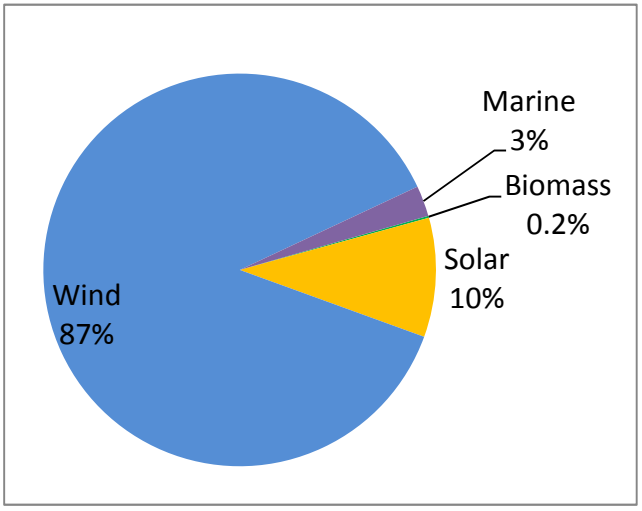


**Figure 1: Breakdown of planned or announced renewable energy projects by type**

Based on the 2020 planned or announced capacity and accepted capacity factors, an additional 2.38 GW[11] will need to be installed.

The potential challenge of implementing sufficient projects for the 2020 RET to be met is highlighted in Figure 2. It shows how a significant acceleration in the construction of renewable energy projects is required if the 2020 RET is to be met.

Predicting that outcome in 2020 is challenging. Sufficient approved projects are available to meet the 2020 RET, and provided the investment uncertainty clears, the industry should be capable of deploying these projects prior to 2020. Some pressure on the delivery of the projects is to be expected[12], and this may introduce delays.

[11] Based on Energetics assumed capacity requirements of 4.88GW and the current projections of 2.5GW in installed capacity.

[12] "Construction costs to rise in RET deal, Origin CEO warns", The Australian, 21 May 2015

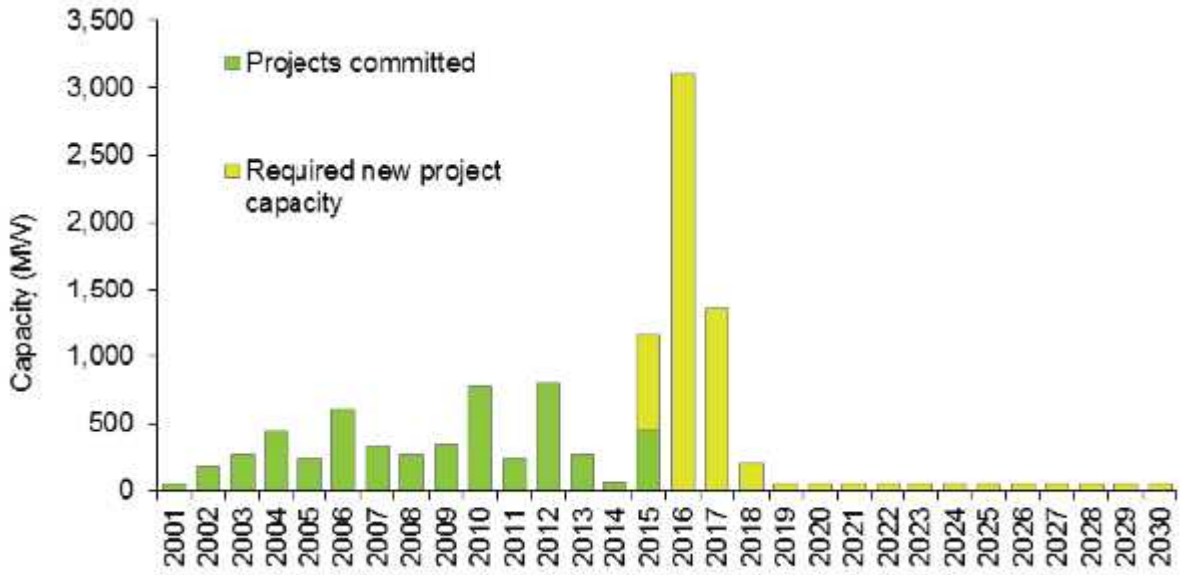


**Figure 2: Installed capacity required to maintain REC market liquidity[13]**

**Box 1: Capacity factors used in analysis**

The capacity factor of a power plant is the ratio of its actual output to its potential output, if it were to operate at full capacity continuously over the same period of time. The table shows the capacity factors for the various renewable energy sources used in the analysis

| Fuel source | Biomass | Solar[14] | Wind[15] | Marine | Average |
|---|---|---|---|---|---|
| Capacity factor | 50% | 18% | 37% | 50% | 35.5% |

The weighted average capacity factor is based on the total planned capacity (MW) as reported by AEMO.

## 2.2. Meeting the post-2020 targets

The situation in the period after 2020 is more challenging. In section 1.2, we outlined the trade-off between expanding renewable energy to decarbonise energy use and measures such as afforestation to offset emissions. In this section, the capacity of wind and solar PV to meet an expanded renewable energy target is explored.[16]. Table 2 explores this issue. The table shows the following items:

- Expanded RET: This is a scenario for the RET out to 2030 which calls for a doubling of the current target.

[13] Source: Green Energy Markets reported in "Renewables target needs 3,800MW of large scale renewables within 12 months", RenewEconomy, 16 October 2015

[14] "Who's afraid of solar PV?", Mike Sandiford, The Conversation, 21 August 2012

[15] "Wind energy runs at near 50% capacity in Australia in July", RenewEconomy, 14 August 2014

[16] Note that the Australian Government has not flagged any change to the RET.

- Projects in the AEMO database: These figures assume that all announced or planned capacity (as per Table 1) reaches commercialisation prior to 2030. We applied the average capacity factor from Box 1 to determine the volume of renewable electricity from the implemented projects. For all post 2020 capacity with no completion date, Energetics has assumed a linear uptake.
- Forecast by BREE: In 2014 the then Bureau of Resources and Energy Economics published projections of energy use in Australia out to 2050.[17] These included estimates of the volume of renewable energy generation.
- Forecast by Geoscience Australia: Geoscience Australia and BREE published an update to a major study into Australia's energy resources in 2014. The study looked at wind and solar resources in detail and included forecasts of electricity generation from these renewable sources in 2030.

**Table 2: Meeting an expanded RET (TWh)**

| Year | Current RET | Expanded RET | Projects in the AEMO database | Forecast by BREE | Forecast by Geoscience Australia |
|---|---|---|---|---|---|
| 2020 | 33.85 | 33.85 | 26.8 | | |
| 2025 | 33 | 40 | 43.4 | | |
| 2030 | 33 | 66 | 60.0 | 37.6 | 48 |

Wind and solar projects planned for the period to 2030 will just about meet the 2030 RET in the modelled scenario. However, the projected generation from these renewable sources as determined by BREE and by Geoscience Australia falls well short of the modelled target. Note that these projections were made in the context of government policies in place at the time.

There remains significant potential for additional investment in new build renewable capacity in Australia out to 2030: potential that could grow even further as Australia's 2030 emissions reduction target evolves over the next 15 years. However, the market will be looking for more investment certainty if the potential is to be realised.

We expect that the projects in the AEMO database target the most favourable locations to locate utility scale renewable generators, and the additional projects that may be required to meet an expanded RET in 2030 will be less financial beneficial to the project developers.

## 2.3. Key outcomes

- There are sufficient approved ("shovel-ready") wind and solar projects for the 2020 RET to be met. However, there are differing views in the market as to whether the uncertain investment climate will see sufficient projects implemented in time.
- There are not sufficient approved or planned wind and solar projects in the states covered by the NEM to realise the modelled 2030 RET of 66 TWh.

[17] Australian Energy Projections to 2049-50, BREE, Canberra, November 2014. BREE is now part of the Office of the Chief Economist.

- Projections by BREE and Geoscience Australia suggest the modelled 2030 RET will not be achieved. However, these projections were made in the absence of a firm 2030 RET that would drive investment in renewable energy capacity in the decade up to 2030.

Whether this current shortfall will be supplemented by additional wind and solar projects, or whether heat credits from biomass projects could play a role, is explored below.

# 3. Biomass and the decarbonisation of heat generation

In Section 1.2, Energetics explored the trade-off between abatement achieved though land use change which must be funded through the purchase of ACCUs or abatement through decarbonising energy use in Australia. There are existing policy measures in Australia that directly address the decarbonisation of electricity (for instance, the RET) and the decarbonisation of transportation (for example, the subsidising of fuel ethanol). However, **there are no measures that directly address the combustion of fuel for industrial heat or residential heat.** A clear gap in policy measures can be seen.

There is, at best, limited support for decarbonising the combustion of fuel for industrial heat or residential heat. Substitution of a fossil fuel with a renewable fuel such as waste wood from the processing of forest products for the generation of industrial heat could be used to generate ACCUs for sale to the Commonwealth through the ERF or to private buyers.

As a result, Australia lags in terms of the contribution bioenergy can make to electricity generation, with 0.9% of electricity in Australia sourced from bioenergy compared to 2.4% across the OECD.[18]

### 3.1.1. Forest residue used for industrial heat generation – an opportunity for Australia

Decarbonising heat generation is achieved primarily through the use of solar thermal processes, bioenergy and geothermal processes (subject to the availability of appropriate resources). For instance, while eligible RET activities are predominantly aimed at electricity generation activities, small-scale technology certificates can be created through the installation of residential hot water heaters.

The Clean Energy Finance Corporation (CEFC)[18] noted that bioenergy and energy from waste technologies have a long track record of cost-effectively reducing carbon emissions. Yet these technologies are not widely deployed in Australia. Cogeneration of heat offers opportunities to reduce other impacts such as waste disposal costs and pollution from particulate emissions, sulphur dioxide and nitrogen. The CEFC sees significant opportunities for investment in bioenergy in Australia including energy from plantation forest residues. They estimated that the Australian bioenergy and energy from waste investment opportunity to 2020 is between $3.5 billion and $5 billion. However, as of 30 June 2015, the Clean Energy Finance Council (CEFC) provided just $80 million in funding for bioenergy projects, compared with $259 million for wind and $395 million for solar PV[19].

The CEFC also remarked that plantation forest residues may find a ready market for export as wood pellets for use in power generation, particularly in Europe. Apart from biomass co-fired in coal-fired power plants on a small or pilot scale, there is relatively little plantation forest residue used for energy in Australia. By comparison, forest biomass[20] contributes around two-thirds of renewable energy in Europe, mostly used for generating heat.

[18] "The Australian bioenergy and energy from waste market", Clean Energy Finance Corporation, November 2015

[19] "CEFC national portfolio by technology 2014-15", Clean Energy Finance Corporation, available at http://www.cleanenergyfinancecorp.com.au/investments.aspx

[20] Note that European forest biomass is made up of three predominant sources stemwood – wood from the stems of the tree; harvest residues (including stemwood harvest losses); and stumps and course roots. Source: http://www.iinas.org/tl_files/iinas/downloads/bio/IINAS_EFI_JR-2014-Forest_biomass_for_energy_in_the_EU_Annex.pdf

The efficient use of forest residues for the generation of heat is an opportunity for Australia. The section below looks at how appropriate policy measures encourage the use of biomass including forest residues for heat in other jurisdictions. We note that many of these measures are aimed at residential heating (ie fireplaces and small boilers) and that the demand for residential heating is much greater in Europe compared to Australia. Therefore, the focus is on biomass for industrial heat.

### 3.1.2. International experience for heat generation credits from biomass

The role of biomass for heat generation outside of Australia is clear. For instance, these next two figures summarise the situation in Europe. The first (3) shows the allocation of energy from biomass to heating, power generation and production of transport fuels. The second shows how forestry is the major source of biomass used in Europe.

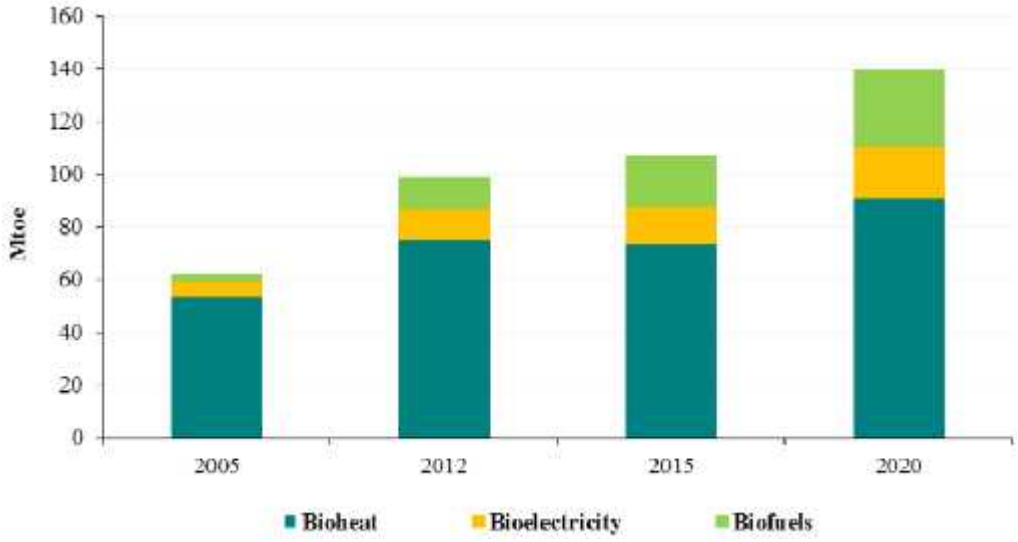


**Figure 3: EU biomass consumption in electricity, heating, and transport**[21]

[21] Source: "State of play on the sustainability of solid and gaseous biomass used for electricity, heating and cooling in the EU", European Commission, July.2014. Mtoe means millions of tonnes of oil equivalent

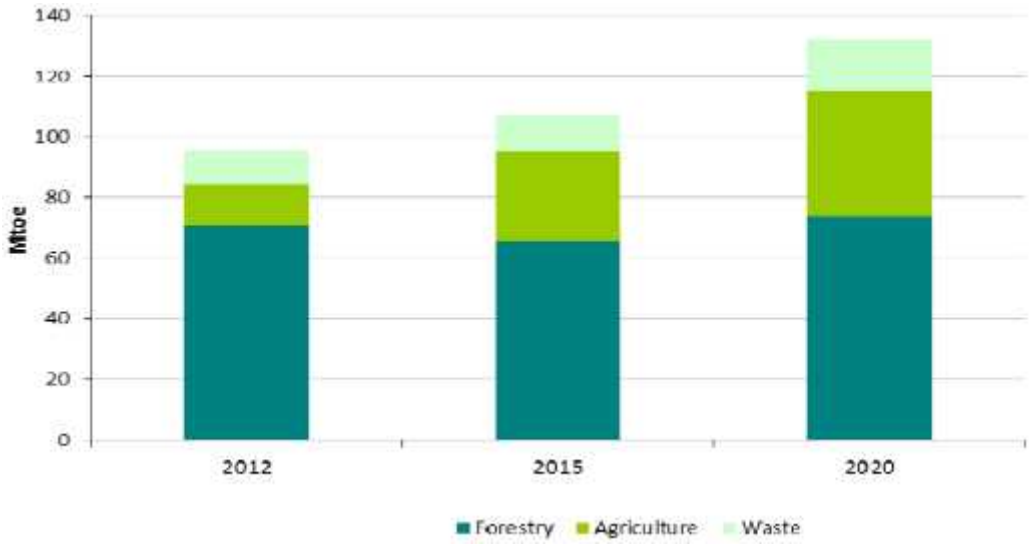


**Figure 4: EU biomass supply for electricity, heating and cooling**[21]

Heat credits from biomass projects have a long history as being a common contributor to global equivalents to the Australian RET. Heat certificates are considered as fungible alternatives to electricity generation certificates.

In Europe, biomass for electricity generation, heating and cooling is estimated to contribute 45% of the EU renewable energy target. By 2020, the EU estimates that 1,046 TWh of biomass will be used for heating in Europe[22]. In 2012, the European bioheat and bioelectricity sectors generated a turnover of €33 billion and employed over 374,800 people.[23] By contrast the Australian bioenergy sector employs just 2500 people and contributes just 2.4 TWh for energy and heat in Australia.[24]

The following table provides an overview of some best practice international examples of renewable energy certificate schemes focusing on the following:

- the inclusion of wood waste products, including sawmill waste, as well as plant feedstock
- the existence of sustainability protocols governing projects.

**Table 3: International examples of heat credits from biomass**

| International scheme | Inclusion of heat credits | Scheme overview and sustainability practices |
|---|---|---|
| US – Connecticut, New Hampshire, Massachusetts and Maine RPS | Yes, with limitations (included in Alternative Portfolio Standards) | RPS schemes includes a provision for 'sustainable biomass' projects, with sustainable biomass defined as biomass cultivated and harvested in a suitable way which does not include finished biomass products from sawmills or biomass from old growth timber stands.<br>Biomass Sustainability and Carbon Policy[25] manages biomass projects capable of generating heat certificates under the state |

[22] Source: European Commission, available at http://ec.europa.eu/energy/sites/ener/files/2014_biomass_state_of_play_.pdf

[23] ib id

[24] "Clean Energy Australia Report 2014", Clean Energy Council, 2015

[25] Source: Manomet Center for Conservation Sciences, available at http://www.mass.gov/eea/docs/doer/renewables/biomass/manomet-biomass-report-full-hirez.pdf

| International scheme | Inclusion of heat credits | Scheme overview and sustainability practices |
|---|---|---|
| | | RPS. Wood procurement practices are required to be sustainable, and the state also set up a reporting system requiring licensed foresters to attest they've left a minimum coverage of tops and branches in the forest canopy, no old growth forests are being harvested, and that soil quality is being preserved and improved. |
| UK – Renewable Heat Incentive | Yes | The UK Low Carbon Energy Initiative supports biomass projects through the Renewable Heat Incentive as developed through the UK Bioenergy Strategy.[26] The Strategy provides the guidelines for eligible projects, while the 'sustainability standards for electricity generation from biomass' establish project eligibility criteria. General restrictions apply to using materials sourced from land with high biodiversity value or high carbon stock, including primary forest, peatland, and wetlands. A biomass project must demonstrate that it does not give rise to deforestation, degradation of habitats or loss of biodiversity. |
| Sweden and Norway – EU renewable energy target | Yes | In 2012 Sweden and Norway launched a common market for green certificates to encourage investment in biomass cogeneration.<br>Biomass products within the scheme include wood pellets, wood chips, solid by-products and recovered wood[27]. All certificates created are subject to the EU Sustainable Forest Management principles, as defined by Forest Europe[28] |
| Finland - EU renewable energy target | Yes | Certificates for biomass projects include the use of forestry products as a feedstock, including wood chips and log wood, as well as forestry residues, demolition wood and wood processing residues (such as sawmill residue and bark) provided that certification is given.[29] A bonus feed-in-tariff is paid for cogen plants.<br>All biomass projects using forestry products are subject to the Sustainable Forest Management principles.<br>The Finish government 2020 strategy seeks to increase the share of renewable energies in total final consumption from 28% in 2010 to 38% by 2020, and reach 6 TWh of wind power generation by 2020 and 22 TWh of forest chips utilised as fuel by 2020.[30] |
| France – Heat Fund and Renewable Energy Feed-in Tariff: Biomass | Yes | The Heat Fund supports the production of heat from biomass (forestry, agriculture, production. Heat Fund projects are eligible for energy saving certificates as well as funding incentives. The fund aims to generate 1.4TWh of biomass heat per annum. |
| Italy – Bio-methane subsidies and Renewable Energy for Heating and Cooling | Yes | Italy provides both incentives for the production and use of bio-methane as well as funding for the small scale production of thermal energy from biomass projects (small scale commercial and residential). Funding is available to both the public administration |

[26] Source: UK Bioenergy Strategy, available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48337/5142-bioenergy-strategy-.pdf

[27] Source: Swedish Bioenergy Association, available at http://www.bioenergytrade.org/downloads/iea-task-40-country-report-2014-sweden.pdf

[28] Source: Standing Forestry Committee, available at http://ec.europa.eu/agriculture/forest/publications/pdf/sfcci-report_en.pdf

[29] Source: European Commission, available at https://ec.europa.eu/energy/sites/ener/files/documents/2014_05_biobench_report.pdf

[30] Source: http://www.iea.org/policiesandmeasures/renewableenergy/ (Accessed April 2016)

| International scheme | Inclusion of heat credits | Scheme overview and sustainability practices |
|---|---|---|
| programs | | and private parties. |

Several countries acknowledge the particular benefits of renewable energy from forest products by offering favourable feed-in-tariffs for electricity sources from biomass depending upon the size of the generator. Examples include Austria (€ct 8.9 to €ct 14 per kWh) and Germany (up to €ct 23.73 per kWh according to plant size and fuel).[31]

[31] http://www.res-legal.eu/ (Accessed April, 2016)

# 4. Policy implications for Australia

A policy gap is identified with no adequate measures to support heat generation from biomass in Australian. Clearly there is international precedence for the inclusion of large scale heat credits from biomass across numerous jurisdictions including US, UK, Sweden, Norway, Finland, France and Italy.

This study has considered the expansion of the RET to include heat credits. The inclusion of industrial heat within the RET is consistent with the stated aims of the RET "*to encourage the additional generation of electricity from renewable sources*" and "*to reduce emissions of greenhouse gases in the electricity sector*". It will do this by encouraging cogeneration at the source of the wood waste.

The processing of forest products at facilities such as sawmills generates significant volumes of wood waste. These facilities also have a requirement for heat and electricity. The ability to generate renewable energy certificates for the heat used at the facility as well as the electricity used at the facility, or exported, would encourage the efficient conversion of the wood waste to heat and electricity. This will then aid the decarbonisation of fuel combustion for heat as well as decarbonisation of electricity.

There are a number of factors that favour the introduction of heat credits into the RET. Some address potential roadblocks and others encourage the market. First, heat can be metered just like electricity. The systems that have been developed in Australia to manage the reporting of energy use and emissions, and the systems that support the creation of ACCUs, will enable the robust measurement of heat credits.

Secondly, RECs are completely fungible in the marketplace whether electric or thermal. The state-based energy efficiency schemes have successfully managed the creation of certificates from reductions in the use of multiple energy sources such as electricity, gas and wood. Finally, there is significant potential for Australia to learn from the North American and European experience in growing our market for biomass heat credits.

The Australian plantation timber industry can point to Europe in particular as leading the way in utilising wood waste for the creation of wood waste heat certificates. If Australia was to adopt a similar approach, the key issues that will need to be addressed include:

- Do the European and North American schemes set an appropriate precedent for the type of forestry products that should be included for the creation of biomass heat credits? From an Australian perspective this will be related to the adequate, reliable supply of biomass for heat and power generation, given forest industry's needs
- The economic competitiveness of biomass energy. Can it compete with other energy sources over time without significant subsidies in Australia?
- What sustainability frameworks need to be established to govern the long-term treatment of biomass heat certificate projects?
- Should the RET be held constant so that the introduction of a new source of certificates will put downward pressure on certificate prices, or should the RET be expanded to make space for the heat credits?

Several studies have highlighted the potential contribution of the utilisation of biomass to Australia's emissions reduction target. ClimateWorks[32] suggests that biomass and biogas for power generation could contribute 7 Mt $CO_2$-e of emissions abatement in 2020. While this figure includes biomass from crop residues such as bagasse, it would not have accounted for potential savings due to the displacement of fuel for heating.

[32] "Low Carbon Growth Plan for Australia", ClimateWorks Australia, March 2010

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**Energetics is a carbon neutral company**

## Disclaimer

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# Project details

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| Chris Lafferty | Emma Fagan |

| Description | Prepared by | Reviewed by | Approved by | Approval Date |
|---|---|---|---|---|
| Version 1: Initial draft for client review | Emma Fagan<br>Gordon Weiss | Peter Holt | Gordon Weiss | 6 April 2016 |
| Version 2: final | Emma Fagan<br>Gordon Weiss | Helen Wetherell; | Gordon Weiss | 14 April 2016 |

## About Energetics

Energetics is a specialist energy and carbon management consultancy. Our experts help clients to

**Be leaders**. Develop and implement strategy
**Be informed**. Make data-driven decisions
**Be efficient**. Drive business improvement and realise savings
**Buy better**. Leverage energy supply and carbon markets

**2014**

- Winners of BRW Client Choice Awards: - Best Professional Services Firm (revenue < $50M)
  - Best Consulting Engineering Firm (revenue < $50M)
  - Best value
- Finalists: BRW Client Choice Awards for Best Client Service, Most Friendly and Most Innovative

**2013**

- Finalist: BRW Client Choice Award for Best Client Relationship Management
- Finalist: Leading in Sustainability Banksia Award

**2012**

- Winner: Australian Business Award for Recommended Employer
- Winner: Australian Business Award for Service Excellence

**2011**

- Winner: BRW Client Choice Award for Best Value
- Finalists: BRW Client Choice Awards for Exceptional Service, Most Innovative, Outstanding Client Care and Best Consulting Engineering Firm (revenue <$50 Million)