

Ahika's Submission to the Productivity Commission's Low Emissions Economy Inquiry

from Ahika Consulting- 05 May 2018

Thank you for the opportunity to submit our feedback on the Low Emissions Economy draft report (27 April 2018). Our submissions will focus on Part 4- Emissions sources and opportunities, Section 13 Heat and Industrial processes. However, before we outline our feedback I would like to take the opportunity to congratulate the Government for setting such ambitious and lofty targets for New Zealand that will assist with combating climate change.

Ahika Consulting is a Dunedin based company with a focus on sustainability, environment and energy efficiency. Ahika was established in 2011 as a merger of two consultancy companies that have been operating in Dunedin since 2007.

1. Ahika's experience in the sector includes detailed feasibility studies for heat plant, regional supply studies, local supply studies for individual plant owners, engaging with a range of sawmills and other wood manufacturers to understand resource supply opportunities, peer review role, industrial scale fuel tendering, negotiating fuel supply pricing with suppliers on behalf of end users and providing technical support for new wood energy projects and wood to coal boiler conversions.
2. Ahika (and its former companies) have been operating in the wood biomass energy space since the first EECA Wood Energy Grants Scheme (WEGS) was established in 2008. Because of our early interest in the wood energy sector, we have been involved in a number of projects that have helped to progress the sector. These projects have included:
 - 2.1. Providing technical support for large industrial clients in the financial analysis, fuel supply and wood fuel tendering. This 10MW project will consume 350,000 GJ and is currently being evaluated by the client. We expect that this is just a matter of "when" rather than "if" this project will proceed. This project shows confidence in the long term supply and pricing for wood energy in Otago.
 - 2.2. Provide technical support for a number of successful supply and demand projects including Otago Polytechnic, Mt Difficulty Wines, Sanfords Seafood (Timaru), Niagara Timber, Ministry of Health, Invercargill City Council, Waitaki District Council, Queenstown Lakes District Council, Danone Nutricia, Dunedin City Council. All of these projects have in one way or another providing confidence in the market either as a fuel supply availability or boiler installation perspective.
 - 2.3. Providing technical support for the Wood Energy South (WES) project over 3 year period. The project resulted in a detailed understanding of the fuel availability in South Otago and Southland and converted a number of smaller boilers, coal boiler conversions and the formation of a Southland Wood Energy Interest Group that still continues to meet quarterly.
 - 2.4. Holding information events including conferences and local 'forest to furnace' tours.

3. Ahika has also supported the Otago Mayoral Forum project that intends to expand the WES project into Otago. Support for the project is unanimous across all councils (CDC, CODC, DCC, ORC, QLDC and WDC) but support from government is essential. Ahika completed a detailed project assessment to understand demand and supply opportunities and how the forum could implement this project. The report identified some key opportunities :
 - 3.1. There are approximately 125,085 Ha of planted production forestry in Otago which would provide sufficient volumes of wood fuel to meet demand over the next 45 years. This does not include small “mum and dad” forest blocks, that are significant and due for harvesting as many of these forests were planted in 1990.
 - 3.2. There are approximately 367 boilers operating in the Otago Region. They range in size from small commercial scale (<100kW) to large industrial (>10MW) boilers.
 - 3.3. Opportunities for new wood fuelled plant include:
 - at least 50 school boilers are due for replacement over the next 5 years. (The Ministry of Education replacement policies favour renewable fuel options.)
 - at least 26 high priority coal fuelled facilities could be replaced by wood fuel representing more than 70 MW, 1,000,000 GJ of energy and 84,000 t CO₂-eq per annum.

4. The report is available on the Bioenergy Association website (<https://www.bioenergy.org.nz/resource/otago-wood-energy-project-scoping-study>) and builds on the learnings from WES while providing a pathway for implementing a project strategy for Otago. This will also provide a framework for other regions as Ahika believes a national-operated-regional-led approach will be a more successful long-term strategy for biomass. The main strategies for an Otago project are:
 - 4.1. The need for additional fuel availability studies for areas of Otago not already covered so security of supply concerns can be answered and future planting plans can be developed for any future shortages
 - 4.2. Utilise the strengths of the individual districts to strengthen the sector.
 - 4.3. Upskill Council staff on wood energy as some councils are very interested in the sector but have little information.
 - 4.4. Establish additional supply and competition in Otago and NZ via a co-operative fuel hub model
 - 4.5. Coal is expensive to transport long distances so the project will identify industrial coal boilers that are far enough away (from the mines) to make wood an economic alternative. Several of these sites have been identified and we have already seen one large industrial scale site in Timaru convert its steam boiler to woodchip recently. There has also been interest from a large meatworks in Rangiora to follow this same route.
 - 4.6. The Education Sector will be important to this project as there are more than 50 boilers due for replacement in the next 5 years. These boilers will vary in capacity ranging from 100kW to 1.2MW. In addition, the project will promote the message to the next generation of a low carbon economy and the part that renewable energy will play.
 - 4.7. The Ministry of Education has recently (2016-17) amended its policy to support renewable fuels in schools¹. *The document states “Boilers can be fuelled with a variety of fuels, including natural gas and biomass such as wood chip or wood pellet. Carbon emissions from*

¹ Section 5.5 Boiler Options, <http://education.govt.nz/school/property/state-schools/design-standards/flexible-learning-spaces/designing-quality-learning-spaces/>

fossil fuel use are an important issue and high greenhouse emission fuels such as coal, LPG and fuel oil boilers should be avoided.”

4.8. Based on feedback from the Ministry of Education, the best support this project could provide is:

- Concentrate funding support on feasibility studies for schools and streamline the application and reporting process
- Develop additional local school case studies and a resource booklet for Boards of Trustees on heating options for schools
- Educate school service providers such as School Support Ltd and others on wood energy funding available for feasibility funding
- Capital funding is less attractive to the MOE because the paperwork is time consuming, they already have the capital available and capital depreciation will reduce on the books, which is a main source of future funding. Capital funding for schools will not be pursued unless under special circumstances where a project may need extra support to get across the line.

4.9. Despite have a free source of fuel, wood processor plant such as sawmills are still operating on coal in Otago. Approximately 10MW of boiler capacity are coal and the key to converting these boilers is to provide a turnkey solution that can convert waste wood into a suitable boiler fuel, provide a fuel handling system and ensure reliable and efficient combustion and heat. The Wood Energy Otago Project would work with industry to develop a joint solution and promote this via industry associations or key industry events.

5. Fuel availability and supply will become more important as the sector grows and it will be key that correct information is provided. Wood energy is still a new sector in New Zealand and we are fortunate enough to be able to look over at Europe to see what future issues/opportunities are around the corner for NZ. Ahika has been involved in several recent projects that will provide additional supply in our sector. These are outlined below:

- 5.1. New harvesting techniques are being researched and implemented by wood fuel suppliers. These suppliers have developed their own intellectual property around harvesting which allows them to extract more waste from forests economically. This will become the default for all wood fuel suppliers, especially in the industrial sectors where hog and green waste fuels will dominate.
- 5.2. In 2017, Ahika investigated fuel supply options for the Ministry of Health within the Canterbury region. During this assessment we visited a number of wood processing sites and found large volumes of waste residues in the landscaping sector. However, the largest source of residues was from landfill waste. Due to our infancy in the sector, this resource is currently untapped when in Europe, boiler plant are specifically designed to operate on green waste and even demolition waste. Ahika would be happy to make this report available if required)
- 5.3. The government's 1 billion tree program will also feed into the biomass wood energy sector but this will take at least 30 years before these trees might become available. Nevertheless, long term, this program will also support a full circular biomass energy economy.
- 5.4. Feedback from forest managers suggest the current carbon price is making it attractive to establish new forests in Otago. One company that I spoke with (just last week) has developed at least 500 Ha of new forestry recently in Coastal Otago and doesn't see this trend changing as long as the price of carbon remains at least at current prices.

- 5.5. Radiata pine and Douglas fir aren't the only fuel options and there are many other varieties of short rotation (10 year) eucalyptus varieties that are very energy dense. However, there is no value for farming these alternative varieties unless it can be sold into as an energy crop. What is the potential for a funding mechanism that encourages these short rotation crops?
- 5.6. And there are also other energy crops that can be considered to fill the gap while new forests are established. (Miscanthus)
6. Fuel supply is reasonably understood in parts of Otago, though further assessments are required to get the full regional picture. This main bodies of publicly available work already undertaken on wood availability in Otago are listed below and include estimated tonnes of wood and equivalent energy content expressed in gigajoules (GJ) for useful comparison against Table 1 demand figures.

The South Otago Residue Supply Assessment

This report was prepared for Wood Energy South, Venture Southland and the Energy Efficiency Conservation Authority in July 2015 by Ahika. The report was commissioned to provide certainty to industrial wood energy users within South Otago about the ongoing availability of wood residue as an energy source. The report estimates current annual volumes of 150,000 t (915,000 GF), increasing steadily to 350,000 t (2,135,000 GJ) per annum over the next 45 years.

Developing a Wood Energy Cluster in Central Otago

This report was prepared for QLDC and EECA in 2013 by Ahika. The report outlines a path for establishing a wood fuel sector in Central Otago and identifies potential sites for conversion and fuel supply options from forestry and wood processors. The report indicates a lumpy harvesting profile over 45 years with an average volume of 11,000 t (67,100 GJ) per annum over this period.

South Canterbury Wood Fuel Availability Assessment

This report was prepared for the Ministry of Health to assist with understanding the fuel availability for Christchurch Hospital. The report was led by Ahika with support from SCION and included detailed assessments of wood processors and manufacturers within a 150km radius from Christchurch. The report also assessed the potential for landfill waste residues and developed pricing indicators. The report is confidential but could be made available if required.

7. Councils and government organisations (schools, hospitals) have a key role to play in establishing energy demand in the Regions. These organisations own a large number of heat plant that can be converted to renewable fuels such as electricity and biomass.
8. Dunedin and Otago have a number of good examples that support the wood energy sector. A good number of these sites were established with EECA WEGS support and its safe to say that funding support for capital grants is a very useful lever for getting projects across the line. For projects that have a positive business case for switching from expensive fuels like LPG, diesel and electricity, the funding is an added benefit and the previous \$100,000 per project was always a good sweetener. For projects that are more difficult when coal is the main fuel source,

additional funding may be required, similar to the previous WEGS funding of \$250,000 per project.

9. Funding has always helped to get projects across the line and it should be considered as a tool for encouraging conversions. EECA has not always supporting funding especially for smaller projects so I have also been wondering if another option could be to tie the funding value to the life time carbon emissions savings achieved by the project. The criteria for funding can be based on a relevant carbon price and if the funding is less than the equivalent cost of purchasing carbon credits, then the project will proceed. I also have other ideas on how this could be expanded further if you wanted to discuss this.
10. Your report also makes reference to concerns with environmental respectability (p.352) regarding biomass boilers that are less efficient than fossil fuel boilers. This is a very board statement and from our experience of wood to coal boiler conversions and trials we have found greater efficiency and reduced emissions. Fuel selection is key to ensuring efficient boiler combustion and reduced emissions. In Europe, boilers are closely monitored for emission, which is a good indicator of combustion efficiency, and I have seen several sites where the local council has the power to shutdown boilers if the emissions are too high. These sites have sophisticated measuring equipment within the flue that the council can check at any time. Furthermore, the council has access to the controls and can shutdown the boiler at their own discretion. This certainly provides an incentive to the boiler owners to maintain low emissions and high efficiency. So I guess I'm saying there are tools for ensuring environmental respectability is maintained.
11. While not relevant to Part 4 of the report, it does stagger me that NZ is taking a siloed approach to a global issue. I understand the need to reduce our own emission but I also see countries like Indonesia (where electric scooters could have a huge impact of global emissions) where our dollars could be better spent helping them to reduce their emissions. I couldn't even imagine the difficulties of measuring and verifying such a program but I think it is an option that ahs not been considered as a tool for a global solution...just a thought.

Thank you again for the opportunity to submit on this important document and look forward to the final document. Again, congratulations on the effort and I would like to also acknowledge the willingness of the Commission to take feedback on this. If you require further information please don't hesitate to get in contact direct:

Lloyd McGinty
Ahika Consulting
Director
lloydmcginty@ahika.co.nz
(021) 202-2172