



Biomass processing operations in Canterbury

Summary

The demand for biomass is increasing in New Zealand, with the South Island having a more developed supply chain given the stronger demand in the region. Canterbury Woodchip Supplies Limited and Steve Murphy Limited are both based in Canterbury supplying a range of products from garden mulch through to high quality boiler fuel. It is likely that there will be more biomass processing operations in the future as demand continues to increase around the country.

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Introduction

The South Island has an established supply chain for residues and low-quality logs suitable for processing for biomass. The South Island demand is driven by both the co-firing of coal and woody biomass at industrial sites and the replacement of coal-fired boilers on these sites.

There is only limited recovery of harvesting residues currently in the North Island, with the limited operations linked to the lack of current demand for biomass. Only recently has biomass demand increased in the North Island, and this demand is expected to continue to increase as more sites convert to biomass.

Given some operations have been going for over 10 years, two of these South Island operations were reviewed to better understand the feedstock, products, and market options for biomass.

The recovery of harvesting residues brings several benefits for the forest industry. The largest impact for the North Island steeper land and unstable soils is a reduction in environmental risk of these residues entering waterways. Other benefits are:

- the maximisation of reestablishment areas,
- reduce cost of disposal
- reduce waste – increase utilisation of forest area, reduce landing size
- recycling nutrients
- stabilising slopes / minimising erosion
- potential sales of processed residue.

Canterbury Woodchip Supplies Ltd

Canterbury Woodchip Supplies Limited (CWS) is owned by Brad Coleman and is based out of Arundel, South Canterbury and has been supplying biomass to customers since 2009. CWS also has a satellite yard in Christchurch. CWS has recently sold other parts of the business to concentrate only on supplying the biomass market.

Feedstock for CWS operations

The feedstock for the CWS operations comes from a variety of sources: shelter belts, younger trees (Figure 1), land clearing operations and binwood extraction. Exotic wildings clearance has been attempted but cartage distances make this a hard feedstock from which to make biomass economically.



Figure 1: Feedstock of younger trees from land clearance operations

Feedstock is comminuted by either chipping or hogging depending on the required specification. CWS prefers the Morbark brand of chippers and hoggers as they have proven to be robust and reliable.

Markets for CWS products

CWS supplies a number of products to different end uses. These include:

- Boiler fuel chip
- Animal bedding
- Landscape products and services

Animal bedding is seasonal which does pose capacity challenges. The landscaping part of the business provides a solution for the lower quality biomass and is therefore an important part of the business.

CWS is able to provide a wide range of chip/hog specifications to suit individual boilers, for the fuel market. These can range in size and moisture content. Moisture content can be altered by the onsite dryer system (rotary dryer) which is fuelled by recovery of old wooden pallets.

CWS are increasing their volume under a number of supply contracts for boiler fuel. Examples of the different sized boiler fuel are shown in Figure 2 and 3.



Figure 2: Standard size specification boiler fuel



Figure 3: Larger size specification boiler fuel

Steve Murphy Limited

Steve Murphy Limited (SML) is a privately owned company based in Canterbury whose operations are based around log transport and more recently biomass processing.

Feedstock for SML operations

The feedstock for the operations is mainly binwood and harvesting residues. Cartage lead distances are critical to making the operations viable economically, with a targeted radius of less than 100km from the biomass source to the processing site.

A nearby harvesting operation was viewed in Oxford Forest, Canterbury, managed by Rayonier Matariki Forests. The harvesting contractor was Button Contracting Ltd. A hook bin system was viewed, collecting all harvest residues, including slash (as opposed to binwood commonly seen collected by this method). In this case the operation was a hot deck with the hook bin loaded and taken away as soon as it was loaded.

Figure 4 shows the hook bin about to be unloaded on the skid site.



Figure 4: Hook Bin about to be unloaded from the truck

The cut plan that Matariki Forests had specified included domestic pulp log then binwood below that in priority so the residues being loaded were a mix of harvesting slash (branches, tops and solid wood shorter than binwood length <1.2m). Figure 5 shows the type of residues being extracted.



Figure 5: Example of harvesting residues loaded to bin

Button Logging Ltd operated large loaders with fixed head grapples which allowed for easier compaction of the residues (Figure 6).



Figure 6: Compaction of the residues in the bin

Feedstock was comminuted by chipping with a Bandit 2680 chipper. This chipper has the capacity to be converted to a hogger, but at that time had not been required.

The chipper is mobile but is commonly used in centralised yard. When viewed it was in the Intelligro yard at Rolleston, Canterbury.

Markets for SML products

SML supply a number of products to different end uses. These include:

- Bark
- Boiler fuel chip
- Animal bedding
- Landscape products
- Mulch

Binwood is air dried prior to chipping to reduce the moisture content and provide a consistent product for the boiler market.

The higher value products are Bark and Boiler fuel chip. The value achieved on the lower grade products (Mulch and other landscape products) means these are marginal to produce so the mix of products in the feedstock is critical.

Figure 5 shows the differing grades of mulch and bark separated into bins and available for sale.



Figure 5: Finished products available for sale

Conclusion

Despite differences in feedstock between the two operations, both Canterbury Wood Chip Limited and Steve Murphy Limited operations used all the feedstock available to produce merchantable products.

Having a market for the lowest grade material was critical to the economics of both operations. There were different approaches to drying to reach the required moisture content: both air drying and the use of a rotary dryer. The method used was driven by customer specification requirements.

There was a number of comments made during the visits about the availability of feedstock to meet the increased demand for boiler fuel in Canterbury. This volume will likely have to come from the existing export market as the current domestic supply is matched to the demand, and supply was described as reasonably tight.

Given the increasing demand for biomass this means more demand for forest owners on the lowest quality log grades and residues. It is yet to be seen if this increase in demand will change the existing market allocations between domestic and export pulp logs and biomass or whether more supply can be generated to meet the demand.

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