

June 2013

Summary - WoodScape Model's Outputs

Purpose

The study developed a NZ-specific, techno-economic model that can be used to evaluate potential opportunities for investment in traditional and emerging wood processing technologies.

Key Message

“The NZ wood processing industry has faced tough times with the substantial impact of the global financial crisis, a high NZ dollar and consequent low investment returns from primary wood processing options such as sawmilling. That said, primary processing technologies like sawmilling are vital to the future of a vibrant wood processing industry because sawmillers pay market prices for logs and supplement their income by selling residues, like wood chip to other processors. Without the primary processing sector, new secondary processing options like bio-fuels and bio-chemicals are less viable.”

Overview

Woodco's Strategic Action Plan for the NZ forest and wood processing industry is to increase the volume of wood processed in New Zealand to add value to our forest product exports. The WoodScape study looks at the potential of existing and emerging wood processing technologies to indicate the best ways to add value.

The industry is on an exciting journey in striving to achieve its Strategic Action Plan. The aim of this is to move, over the next decade, from a \$4.5 billion dollar export industry to a \$12 billion dollar sector by 2022.



Methodology

The WoodScape study analysed the financial and market implications of a broad range of wood processing options suitable for New Zealand. The primary measure used to assess how attractive investment in a certain type of technology would be is Return on Capital Employed (ROCE). Other considerations were cash flow, technical readiness of the process and potential markets for the product.

Industry and government experts guided the Scion (a New Zealand Crown Research Institute) and FPIInnovations project team and a series of workshops were held as part of the study to get input and feedback from forest growers, wood processors and regional councils.

The study looked at 39 traditional (currently commercially available) and emerging (developed to at least pilot stage) wood processing technologies including:

- ◆ Sawmilling
- ◆ Engineered wood products
- ◆ Secondary wood products
- ◆ Pulp and paper
- ◆ Heat and power
- ◆ Fuels and chemicals.

The WoodScape analysis was used to generate financial and socio-economic measures for each of the technologies. It was also used to test the sensitivity of the results to changes in product, raw material and energy prices, capital, foreign exchange rates and labour.

Five assumptions formed the basis for the WoodScape modelling approach:

1. Markets are available for all products
2. Raw materials are appropriate for each process
3. Costs were based on new plant built in New Zealand
4. Plant utilisation rate was in line with international best practice
5. Product prices and imported consumables were linked to the USD.

Wood processing investment decisions are complex with so many variables involved. It is likely that in the future the industry would take advantage of a combination of complementary technical options.

Most wood processing options make at least a ten-fold greater contribution to GDP per tonne than log exports. However log exports are expected to continue to be an integral part of the NZ forest and wood products industry's basket of product offerings.

Recommendations

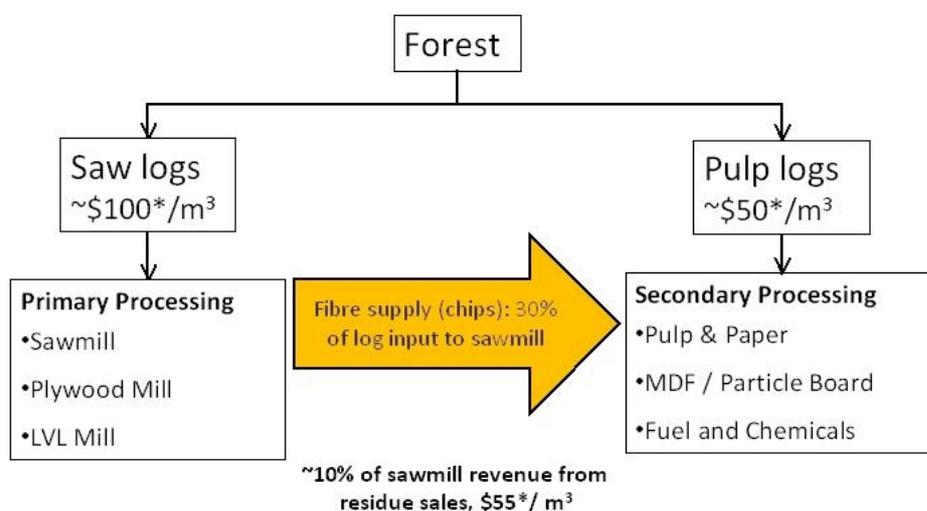
The WoodScape study identified three ways to realise the Woodco strategy:

1. **Compete:** Growth in NZ for primary processing, particularly sawmilling, is limited. We need to look at substantially improving the competitiveness of sawmilling options concentrating on increasing the:
 - a. Value of NZ products in export markets
 - b. Scale of processing plant to take advantage of economies of scale
 - c. Capital utilisation.
2. **Transform:** At the moment the forest sector exports almost 50% of its harvest as unprocessed logs. We need to introduce processing technology so we can process A and K grade logs onshore that are currently processed overseas.
3. **Innovate:** We need to look to new wood processing technologies to add value to the industry. Two promising areas for adding value are:
 - a. Engineered wood products
 - b. Fuels and chemicals.

Compete

The first way for NZ wood processing products to add value to the NZ forestry and wood products industry is by being competitive in other markets.

The NZ processing industry has faced tough times with the impact of the global financial crisis, a high NZ dollar and low investment returns from primary solid wood processing options like sawmilling. But technologies like sawmilling are vital to the wood processing industry because they pay market prices for logs and then supplement income by selling their residues, like wood chip and saw chip, to other processors. Without the primary processing sector, secondary processing options like pulp and paper, bio-fuels and bio-chemicals are less viable.



Simplified model of the wood processing industry showing the interdependency of primary solid wood processing and secondary reconstituted wood processing. *\$ values are indicative only

Most wood processing products are global commodities. For NZ to compete globally we need to:

- ◆ move to larger scale plants to take advantage of economies of scale
- ◆ create new export markets for our products
- ◆ achieve international best practice in capital efficiency.

At the moment NZ industries lag behind in both labour inputs and automation in new plant. More automation could be achieved with capital investment.

New Zealand currently has a lot of small mills and very few large ones. The WoodScape study showed that investment returns can depend on the scale of the operation. Large plants tend to have a significant advantage. Realistically gains from economies of scale are only relevant to large capacity plant so the NZ wood processing industry needs to consider this when thinking of its future. Of course larger plants also need more raw materials so available supply may be an issue with potential of increased transport costs if the raw materials have to be supplied from further away. Production must be maximised in the large plants to make them a viable option.

New markets need to be found if we are to increase the capacity of domestic solid wood processing. To attract investment in sawmilling there is an urgent need for NZ products to be competitive in export markets.

Transform

The current wood processing industry is focused on processing the higher (P & S grades – used in sawmilling, plywood and engineered wood products) and low (chip/pulp grade – used in pulp, paper and MDF) value logs. If we are to increase domestic processing and fulfil the Woodco strategy then more of the medium quality A and K grade logs need to be processed in NZ.

The WoodScape study gives two possible approaches:

1. Put new processing technologies in place for these log grades
2. Bring processing of NZ log exports back into NZ.

More research is needed to find and/or develop the best new technologies for processing of A and K grade logs. In relation to more processing of NZ logs onshore, an investigation of a large-scale processing mill in NZ suggested investment in a mill of this type would produce returns above 15%. An increase in processing in NZ would also mean an increase in available residues for other additional secondary processing.

Innovate

As well as the existing technologies the WoodScape study also considered emerging technologies. Value enhancement is an important aspect of any decision to use new technologies. Value enhancement by technology means the technology used to process the wood adds value to the finished product compared with the raw material cost e.g. the end product may be worth three times the cost of the raw material used to make it.

Of the emerging technologies reviewed engineered wood products and fuels and chemicals showed solid returns and high added value.

- ◆ For engineered wood products it is important for research to be happening so the technical risks are reduced, facilities become more competitive, new higher value products are developed and new markets are found for these products.
- ◆ Several fuels and chemicals added significant value to the raw material uses. The best returns were seen when a chemical component was produced. Fuel production also showed good returns. These technologies are still in the early stages. New Zealand needs to monitor progress in these technologies as they mature. The calculated returns for these technologies assume low-cost raw materials provided by chip grade logs from a sawmill or plywood mill, located in the same region.

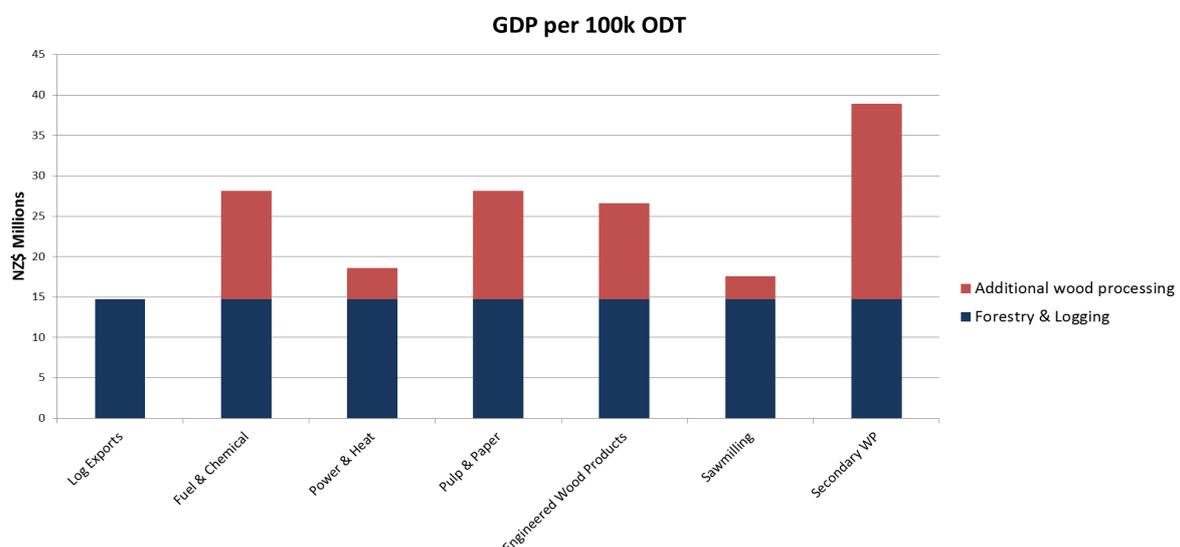
Global Risks

The Woodco strategy’s success relies on global markets so NZ wood processors must adopt a global outlook, particularly the smaller processors. Global markets bring with them a wider range of risks than the domestic market but also greater opportunities for financial success.

Currency fluctuations are an obvious risk when dealing with global markets. It is also vital to have extensive knowledge of any potential export markets. As the Woodco strategy is implemented it is critical for both large and small domestic producers to get accurate information on international opportunities. Asian markets deserve particular focus.

National Opportunities

Increased wood processing has a key role in New Zealand’s economic growth. The graph below shows the average of the direct GDP per oven dry tonne (ODT) of processing technology categories in the model in comparison to GDP for log exports. It is clear that more wood processing in New Zealand would add a considerable value to the national economy through job creation and additional export earnings.



Regional Opportunities

The WoodScape study looked at five wood supply regions to understand the different wood processing options in these regions.

<p>Northland</p> <ul style="list-style-type: none"> o Export of structural timber and structural engineered wood products (e.g. plywood and CLT) o Biofuels and chemicals from forest and solid wood processing residuals - exploiting the presence of the Marsden Point oil refinery. 	<p>Central North Island</p> <ul style="list-style-type: none"> o Large-scale integrated solid wood processing facilities o Large-scale production of biofuels and chemicals o Integration of geothermal energy with wood processing. 															
<p>East Coast</p> <ul style="list-style-type: none"> o Opportunities for new processing facilities using the wide range of log grades available o Distributed processing close to resource o Combined heat and power opportunities integrated with wood processing due to restricted electricity infrastructure north-east of Gisborne. 	<p>Nelson / Marlborough</p> <ul style="list-style-type: none"> o Establish region as a wood-product innovation centre for small-scale high-value manufacturing of engineered wood products (e.g. CLT) and remanufacturing / tertiary products (e.g. kitset houses) – (Regional Workshop) o Add novel technologies to existing MDF plant (e.g. WFP Composites). 															
<p>Otago/Southland</p> <ul style="list-style-type: none"> o Export of appearance grade timber remanufactured appearance products o Exploiting the long term opportunity from Douglas-fir o Building on existing processing capacity and expertise; MDF and veneer /plywood plant o Fuels and chemicals. 	<p>All regions; A & K grade log export volumes, M m³;</p> <table border="1"> <tr> <td>Northland</td> <td>1.26</td> <td>1.03</td> </tr> <tr> <td>CNI</td> <td>2.45</td> <td>2.20</td> </tr> <tr> <td>East Coast</td> <td>0.78</td> <td>0.78</td> </tr> <tr> <td>Nelson/Marlborough</td> <td>0.66</td> <td>0.54</td> </tr> <tr> <td>Otago/Southland</td> <td>0.40</td> <td>0.40</td> </tr> </table>	Northland	1.26	1.03	CNI	2.45	2.20	East Coast	0.78	0.78	Nelson/Marlborough	0.66	0.54	Otago/Southland	0.40	0.40
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Next Steps

The WoodScape study has been conducted at a very high level. The development of this New Zealand-specific model will now enable interested parties to work with Scion to carry out further analysis at a regional and individual company level to identify specific investment opportunities.

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