

Small-Scale Timber Processors Feedback

By Farm Forestry Timbers | For Te Uru Rākau NZ Forest Service

Te Uru Rākau seek your advice and input to help shape the vision behind a small-scale forestry Industry Transformation Plan programme.

The Forest and Wood Processing Industry Transformation Plan (ITP) identifies several goals to deliver transformation of Aotearoa New Zealand's Forestry Industry, such as:

- *increase domestic wood processing by 25% by 2050*
- *grow export earnings from value-added wood products by \$600 million by 2040*
- *increase planting of alternative species to 20% by 2030*

Achieving these goals will require changes across the supply chain and across the various scales of ownership within the forestry industry. Increasing efforts to create industry transformation in small-scale forests and wood processing is strategically important to achieving the above ITP goals. Small-scale growers hold the bulk of the nation's alternative species forest resource and can innovate more rapidly. There are various opportunities to drive greater species and product diversification, the uptake and development of small-scale technology and coordination or aggregation in small-scale systems.

We are proposing to create a small-scale forestry ITP programme. This programme will be a portfolio of work that we are undertaking at Te Uru Rākau focused on initiatives to achieve outcomes through the development of small-scale forests and wood processing.

We would like to explore the issues and barriers that small-scale forestry investors face to help identify potential interventions to support small-scale growers to be viable and enable the transition to a more diverse, high-value sector.

Today we require your input on challenges and opportunities that could be addressed in the small-scale forestry ITP programme.

About Farm Forestry Timbers

Farm Forestry Timbers Society is an incorporated society and independent industry body for promoting and facilitating distribution of locally grown native and exotic specialty timbers in New Zealand. We are the only industry body undertaking this important work.

1. What research and technology gaps are there limiting small-scale processors?

a) What needs are there with regards to small-scale machinery?

Harvesting and extraction

Small scale harvesting requires improvements to cost efficiency at that scale. Although anecdotes are available where continuous cover harvest costs were only marginally greater than clearfell, others report harvesting costs to be as high as the value of the

logs extracted. A much-improved understanding of harvest costs in relation to value generated is required for competing small-scale technologies which would include the economics of harvest methods according to site conditions.

Investigation is required into mechanised harvesting options that offer low transport costs for equipment along with minimal capital outlay. A small research project has recently been conducted in New Zealand by Forest Growers Research (FGR) into using a “quick coupler” mechanism to quickly change between log grapple and grapple processor on the same harvest machine. This research has resulted in a machine being commissioned, with comparative studies and field demonstrations yet to be held. Fully automated couplers becoming available to the forest industry would result in lower costs for smaller operators, who would transport less heavy machinery to the harvest site. This would go a long way towards achieving a paradigm shift enabling small scale harvesting to compete with highly mechanised large-scale operations. Such investments are required not only for improved cost efficiency, but also for the improved environmental and social outcomes that smaller scale harvesting offers. Harvesting smaller areas at a time reduces environmental impacts and also generates higher levels of regional employment that can be sustained over time. Little thought has been given to this by the forest industry that has instead focussed on improving cost efficiency of larger-scale operations at the expense of other outcomes. The result of this catchment-scale harvesting approach has been the loss of social licence to harvest following the devastating impacts from repeated storm events.

The small-scale harvesting sector has traditionally used manual tree felling with a tractor and winch for extraction. There remains a technological barrier for low-cost single tree harvesting. Research is required that explores the tradeoff between labour costs and capital investment and reports on available technologies for winching logs efficiently. Such trials would consider the economics of different technologies and regimes, extraction costs, productivity and environmental outcomes. There are also safety issues for workers engaging in manual tree felling that require attention.

Value to grower

The buyer of wood always values logs as worth less than what the grower wants for those logs. Realising the true value to the grower is paramount to development of a specialty forest sector in New Zealand. Not only is market development required, but costs of harvesting, extraction and processing need to be improved at the small scale so that the grower receives remuneration for their trees equal to their true value. There are two distinct aspects influencing this:

1. Realising true value for specialty timber products requires a market that appreciates renewability. For example, natural durability should yield a premium over the equivalent preservative-treated product, because the wood is natural and renewable. However, the timber market does not currently differentiate between renewable and non-renewable wood products. Consumers have no awareness that the preservatives in H3.2 CCA-treated radiata are not renewable, cannot be recycled and the wood cannot even be used for fuel. Indeed, the product contributes in no way to a circular bioeconomy despite dominating the market. Until consumer awareness is raised, purchasing decisions may not recover the higher costs of production for naturally durable timber as a premium.

Regulatory settings may be required for a circular bioeconomy to emerge, such as including end of life environmental costs included in the price of products. This is a broader issue than timber and includes recyclability of all consumer products. Meanwhile, we ask how can the consumer be made aware of the realities of preservative treatment without dividing the wood industry into us and them? We have promoted NZ grown specialty timbers for ten years, and conclude that market development requires more resources, especially in consumer education and promotion of “truly renewable”.

2. Costs of production need to be reduced at the smaller scale. Harvesting, extracting, and processing of trees into long-lived wood products efficiently at the small scale is challenging but possible. The whole value chain is underdeveloped, and R&D is required to optimise and improve scale efficiency. To date, neither the forest industry nor the wood processing industry have provided support to our sector, because their focus has been solely on radiata pine.

Sawmilling and processing

Within our sector there are innovators working on their own efficiency to improve their margins. However, they focus on their own operation and tend to concentrate on handling efficiencies and small tweaks to traditional methods and available equipment. Machinery that handles logs, machinery that handles timber, and yard layout tend to be customised by the individual operator for their needs and scale. However, transformational change requires a dedicated, collective effort. Each step in the process requires a fundamental re-think. Sawmill equipment, drying equipment, and timber machining equipment all require significant capital investment. At the small scale this investment is far greater as a cost of output than at the larger scale. This inevitably makes the economics of producing timber products somewhat challenging.

Accessing the capital to establish suitable processing infrastructure is also challenging because of the inevitable uncertainty that results from a process of trialling and refining equipment and methods. Traditional lenders are very risk averse and want to see a business case with demonstrated return on capital sufficient to cover all costs. As a result, the sector has been capital constrained. Individual business owners do what they can, but the funding required will often exceed resources available to them. The result is inadequate or inefficient equipment, and/or lost opportunities for business growth. This is discussed in more detail below.

A range of portable sawmills are available at the small scale that each have their strengths and weaknesses. Portable sawmills are inherently inefficient and require high labour inputs. R&D is required that explores solutions to the inefficiency of small-scale sawmilling, which is a significant cost of production. It is critically important for the sector to improve both the efficiency and quality of sawn product produced at the small scale.

Our members have been trialling various timber drying technologies, including solar drying, for some time. At the small scale, kiln drying of wood can be expensive, but using solar energy to dry wood at low cost is a clear pathway for reducing costs. We have less interest in kiln drying our species from “green” because this would entail considerable research effort on a species-by-species basis, whereas air drying timber followed by kiln

drying is a reliable method for cost-effectively producing a quality product for all our species. Thus, research into reducing costs of kiln drying for air-dried wood is our priority. We would welcome support for the work our members are undertaking into optimising kiln drying of timber at the small scale.

Machining and marketing specialty timbers

Industry requires consistent quantities of timber being supplied into the market and of a consistent quality. Farm Forestry Timbers recognised this a decade ago and produced timber grades according to application. We stand by this method for achieving consistent quality across the sector. However, being voluntary, processors can choose to sell their own proprietary grades of wood. This compromises collective quality standards and confuses the market, resulting in reputational damage for our locally produced specialty timbers. For example, blackwood is being supplied into the flooring market with sapwood included, which buyers will not be aware is highly susceptible to lyctus borer. This severely compromises the quality of the timber for that species, and locally produced product in general. Our grade rules ensure only wood appropriate for the application is sold, but this requires greater uptake in the market.

Aggregation of wood supplies is only achievable once a single grading standard is implemented across the sector. Aggregation offers scale-efficiency, and we suggest that a single industry body should be responsible for setting standards and co-ordinating supply of specialty timbers in New Zealand.

b) What needs are there with regards to a digital communication platform?

Farm Forestry Timbers provides a digital communication platform for the specialty timber sector and represents both processors and buyers for locally grown specialty timbers. We resource this platform as best we can, but to grow the sector additional targeted resourcing would be welcomed.

c) What needs are there with regards to accessing and planting alternative species?

The market drives investment in planting activities. Unless there is evidence that remuneration is adequate to justify the investment, then investment will not occur. This applies to both planting and processing of “minor” species in New Zealand. We suggest that to overcome this barrier, processors would lead the way via innovation and market development. Only once operations are optimised and can demonstrate adequate margins for specialty timbers, and markets are developed sufficiently to realise premiums for specialty timbers, will growers take interest in these species at the scale required. Therefore, investment in BOTH market development and processing innovation should be prioritised.

2. Biomass and bioenergy are a focus of the ITP, how can we facilitate better education of the bioenergy opportunities to small-scale growers?

We contend that small scale relocatable biomass processing plants offer the best opportunity to utilise biomass for energy that would otherwise go to waste. Woody biomass is available across both rural and urban landscapes, that if aggregated would become large quantities of material. Small-scale wood processors also have an abundance of biomass as a by-product of their operations, but because plants that convert this into biofuel product are

currently only available for larger scale operations, in small operations this becomes waste that then requires costly disposal. Dry material is required for transport to a centralised processing plant, so one of the key challenges is to dry woody biomass on site at the small scale. We suggest that scaled-down portable plants producing products from wood waste (such as wood pellets) could collectivise aggregation of biomass across New Zealand. If this were to occur, small scale processors across the motu would be able to supply biomass for efficient utilisation.

3. What challenges currently limit wood processing of the small-scale resource?

a) What challenges exist particularly for small-scale wood processing of native and alternative exotic species?

At the scale in which we operate, we often adapt existing machinery, including agricultural machinery, to meet our needs. Innovation entails risks, and lack of capital emerges as our key constraint to innovation. Small-scale processing plants require lots of expensive machinery, machinery that needs to be highly productive and reliable. The small-scale processor has the log source at one end and their market at the other. It is hugely challenging for that processor to fund purchase of equipment, purchase of logs and employment of labour, all while developing their market for the wood being produced.

For a small processor to be viable, significant capital is required, because older and smaller scale machinery is inherently inefficient. For us the “sweet spot” is somewhere between the small low-efficient scale and the centralised large super-efficient scale.

Inefficiencies also arise from the lack of standardised log grades coming into the mill. Unlike operations dealing with radiata pine, logs arrive at the specialty wood processor in all different shapes and sizes. In contrast, radiata pine is sorted on the skids and logs are standardised and segregated. These logs are then dispatched to different markets. With specialty species, all the logs are sent to one mill.

A range of machinery is therefore required to deal with the range of log sizes, requiring additional capital investment. For example, Woodmizer bandsaws are best for smaller logs of higher value species, whereas Mahoe twin circular saws are best for large logs of commodity species.

Because harvest consultants know nothing about alternative species, the logs are categorised as firewood, then sold by the tonne for all grades because the consultant doesn't know where to sell them. For example, one of our processors recently received a consignment of lusitanica cypress logs from Timberlands, the biggest forest owner in New Zealand. Everything merchantable from buttlogs to headlogs was dispatched and the buyer then had to reject further consignments because of log quality.

Secondary processing of timber and biomass residues is currently cost-prohibitive at the small scale. Processors would like to process wood waste into pellets, thermally modify timber on site, and produce glulam and other engineered wood products on site, but currently technology is only available at a scale prohibitive for our producers. We believe these scale issues can all be overcome using distributed manufacturing (modular plants). However, R&D investment is required to establish effective small scale processing solutions.

To optimise value from processing timber products we require secondary processing options that deal with degrade. Larger scale processors can add value to lower grades via secondary processing. For example lower grades can be docked into short lengths of high-quality timber that are reassembled into engineered wood products. Sapwood boards can be thermally modified into a high-value durable product. However, at the small scale there is currently no equipment available to efficiently produce engineered wood products or modify our sapwood boards. We require new innovations to be able to secure pathways to recover more value from our timber for transformation of our sector.

Market development of specialty timbers in New Zealand is crucial to secure continuity of both demand and supply. Once the market is set in motion it becomes self-sustaining. Central government intervention was required to develop markets for radiata pine, which industry tends to forget.

Investors require confidence in a sales base to be assured that demand will continue into the future. Specialty timber producers have been competing against illegally and dubiously harvested timber imports for decades, timbers that are sold in New Zealand for well below the environmental cost of producing them. Specialty timber producers have been consistently excluded from the building code development process, resulting in preservative-treated radiata pine holding a monopoly position in the timber construction market. A regulatory 'level playing field' is required that considers true environmental costs and benefits for competing products. The destination should be a circular bioeconomy but the pathway there requires genuine transformation rather than just lip service.

We have a vision of a co-operative, central market supply hub for specialty timbers, rather than the current ad-hoc competitive approach, so that scarce capital can be utilised efficiently to achieve economies of scale and aggregation of capital and resources. Our vision includes regional hubs that capitalise on the species grown in that region. We see a role for government to support overcoming the challenges we face setting up a co-operative marketing structure in order to kick start the market for our timbers.

The Industry Transformation Plan supports our objectives. Strategic reasons for this abound, including regional development, employment, product diversification and Maori business development. High value timber products include natural cladding, flooring, decking and appearance joinery. These are mostly imported because radiata pine lacks the special properties required for these applications. Only once purchasing decisions align with consumer values, will demand for locally produced specialty timbers escalate.

4. What gaps are there in current technology, research and development that limit wood processing of the small-scale forest resource?

a. In particular, what gaps are there for native and alternative exotic species

Sawmilling – Currently available small-scale sawmilling technology tends to either be production-efficient and lacks cost-efficiency; or is cost efficient but production inefficient. Support is required for industry-led R&D to resolve this technology hurdle.

Drying – There is a need to accumulate knowledge around kiln drying technologies, for example dehumidifier vs vacuum kilns vs solar drying kilns. Economic research would reveal the “best bets”.

Processing – Machinery is available for different scales. However, small, low cost four-side planing machines may not be cost effective for a small processor compared with freighting to a processor who operates a larger eight-sider worth over \$100,000. Economic research would reveal best options according to scale.

Thermal modification is possible at the small-scale using oil-bath technology. This technology has been developed in Europe but not been tested in New Zealand. The existing TM kilns in New Zealand are all larger scale heat + steam + pressure.

We lack durability performance data for our naturally durable species. For building code compliance quality durability performance data is required for each specific species according to application. A range of tests are available according to the application, but these take time and are expensive via current service providers. Industry-led durability performance trials are required on multiple sites to produce the data quality we require.

b) What opportunities or initiatives could help spread and increase the uptake of wood processing technology in small scale systems?

Market development of specialty timbers is required that generates awareness of their qualities, appeal, and advantages of our locally-grown specialty timbers.

The chicken and egg dilemma must be overcome. What comes first, the market for specialty timbers or their supply into the market? An example is the market potential for blackwood, one of the world's finest and most valuable timbers. There is not sufficient good quality blackwood timber in the marketplace to develop the market. That is sitting in tree form throughout the country. However, until 1000 cubes are dry and ready for sale, the market cannot be developed. There is significant market potential, even a lucrative export market, but because the market doesn't currently exist the trees are not being harvested.

Leadership for "timber first" is required from Government in their procurement activities, especially Te Uru Rakau. However, we have just been informed that the first concrete tilt slabs have been installed for Te Uru Rakau's building in Rotorua! A "wood first" policy is required in New Zealand, with natural timbers at the helm of the circular bioeconomy.

Small-scale Investment into Native and Alternative Wood Processing

b) Can small-scale investors fund investment in small-scale wood processing capital? If not, why can't they?

Small scale investors require suitable technology and investment sources. This requires development, so that quality wood is produced cost-efficiently at the small scale. This was discussed above.

There are limits to the amount of capital that small scale operators can provide and this is often less than is required to proceed with a development. In situations where new systems are being trialled, the outcome can be uncertain, which increases the risk and makes external funding even harder to obtain. This was discussed above.

c) What would small-scale growers need funding for to be viable and transform towards processing a native and alternative exotic forest resource? How much could this cost?

Funding is required for industry players who seek to innovate and produce the next generation of equipment that overcomes the current scale inefficiency bottleneck and enables secondary processing of additional products from lower grades of timber.

It is hard to give exact costs, but our assessment is that many projects would fall into the \$200,000-\$2.0 million range for distributed processing. Regional processing hubs would cost more and require support in the first instance for technical research and business case development.

There is also a case for low interest or deferred interest loans for growth. These would assist businesses to achieve economies of scale that are needed for profitability. For example, it can take years for a processor to build up stock levels. Traditionally this is funded by reinvestment of revenue and profit. There are very large holding costs to having \$1-3m of stock sitting around drying and a long delay between expenditure on logs and sale of processed timber. At commercial finance rates, even if borrowing can be secured, the whole exercise can become unviable, especially for family-owned businesses without deep pocket-corporate backers.

d) Would you apply for a programme which seeks to support processing of native and alternative species by funding wood processing capital?

Our members seek and require investment in the sector, because our sector benefits the whole of society. We cannot do this alone. So yes, members would apply for funding, but funding criteria needs to be flexible enough to recognise the small to medium scale processors unique situation, what we offer to society and the constraints we face.

The recently announced Wood Processing Growth Fund (WPGF) is designed to expand the wood processing sector and aims to “unlock the potential of our forestry resource by providing investment finance for innovative and exploratory support and investment-ready capital projects”. However, the Accelerator funding part of the WPGF limits applications to:

- those over \$2m in total project cost,
- that are technically and commercially feasible,
- and have a supporting business case.

This means that applications less than \$2m where there is any degree of uncertainty regarding technical and commercial efficiency, or where testing or development is required, will not be considered. This is likely to be the case for most of the innovation and development required in the small-scale processing sector.

We also assume that projects that are technically and commercially feasible should be able to be funded through normal bank finance and therefore do not need Government debt financing at the equivalent interest rates.

e) Do you know any investors or small-scale processors looking to invest in wood processing capital to produce higher-value products from native and alternative species?

We are an industry body that represents small-scale processors of specialty timbers. Our members have and will continue to invest in processing technology that enables them to stay in business and

compete in the timber marketplace. However, for significant growth additional investment is required, as explained in this document.