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Market trends and opportunities for NZ's wood and bioenergy products

Peter Hall, May 2025



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Executive summary

The global market for New Zealand's wood products has changed in the 12 months to the end of October 2024 and continues to change. Without an understanding of strategic drivers for these changes, New Zealand will struggle to sell its forestry-derived products into international markets at financially viable prices. We need to understand who is likely to buy our logs and other forest products, what they will want, and what we can produce.

New Zealand log exports to China have grown substantially over the last 15 years, but there has been a recent shift in the Chinese economy and China's demand for logs. A massive overbuild of apartment housing has led to a slowdown in log demand and a drop in log prices that looks like it will persist for some time. This contrasts the drop and rebound trends we have typically seen over the last 2 to 3 years. There is also growing uncertainty due to the looming trade war based on the USA's imposition of tariffs on products from a wide range of countries.

This analysis aims to summarise New Zealand's current and projected log supply. It examines the potential use of New Zealand's wood surplus for wood and bioenergy products both domestically and internationally. International market trends are summarised for the key Chinese market as well as the United States and Canada. Our conclusion is that, to ensure strong future export growth for New Zealand wood and bioenergy products, New Zealand needs to consider broadening its wood marketing to include a range of countries on the Pacific Rim, particularly in Southeast Asia.

Key results

New Zealand has had, and will continue to have, an excess of logs after demand from domestic log processors has been met. This excess is currently around 20 M m³ per annum, but due to harvest rates is expected to shrink over the next 10 years to around 10 M m³ per annum and then increase back to around 16 to 17 M m³ per annum by approximately 2040. Harvest volumes of most log grades will follow this trend, except for pruned logs that will continue to decline. New Zealand's domestic demand for logs is mainly for sawmilling, pulp and paper, and MDF/particle board. In recent months, demand from pulp and paper mills has declined due to mill closures.

The traditional major log market of China is not expected to take the same volume of logs over the next 10 to 15 years that it has over the last 10. Further, the type of logs it wants is likely to change with higher grade logs being preferred. Currently, China takes a lot of small diameter, short length, knotty logs (e.g., K grade logs) for use as concrete formwork in apartment construction. This market is expected to shrink in the short and long term. Over the last 4 years, export log prices have not just fluctuated but have declined. This decline is well beyond just failing to keep up with inflation.

Critical changes are expected in New Zealand's domestic energy markets that could increase future onshore processing volumes for wood-based bioenergy products. Coal use will be limited beyond 2037 due to government regulation and the domestic gas supply is declining. The resulting reduction in coal and gas supply is expected to lead to an emerging domestic energy gap, especially in the heat energy market. This will increase interest in the use of biomass including wood chip, hog and pellets (both black and white) for industrial heat and electricity generation. Wood fuels are competitive on price and not vulnerable to future increases in carbon price compared to fossil fuels. Long-term future domestic demand for wood to produce energy could be equivalent to 8 M m³ per annum.

Globally, there continues to be substantial deforestation at the same time as increasing demand for wood for products and energy. Sustainability will be an increasing factor in the demand for wood products, as more countries seek to prevent deforestation and unsustainable forestry practices. This should enhance New Zealand's ability to export logs and wood products, especially to countries that have limited sustainable forest resources. Preliminary analysis suggests there are existing, potential, and developing markets in Southeast Asia for a range of Engineered Wood Products such as CLT, LVL, Plywood as well as OSB, veneers, and remanufactured wood products. Overseas demand for pellets is expected to rise, driven by energy policy in countries such as Japan and Taiwan.

Implications

The ability of the New Zealand forest industry to supply local processing with high-quality sawlogs, whilst selling lower grade co-product logs overseas, may be affected by the change in log demand from China. This implies a need to find domestic uses for lower grade logs and/or identify new markets offshore.

New Zealand has long-term potential to increase its onshore wood processing, and the lower-value logs are cost competitive in the domestic energy market. This potential is in the order of 10 M m³ per annum, although retention of some log export volume over the next 10 years might be prudent to maintain export markets for future growth.

Finding an international market for lower-value logs is challenging in the short term, but in the longer-term several options have potential including Engineered Wood Products and energy. Research and development into new engineered wood products and wood construction systems, aimed at getting the best out of New Zealand's wood resources, would have long-term value to New Zealand.

Further work

Diversification of export markets is key to ensure the future stability of the New Zealand forest industry. We have provided a preliminary overview of potential future markets in Southeast Asia and some smaller developing economies on the Pacific Rim. While these economies may not take huge quantities of wood in the first instance, they could grow into more significant opportunities over time. A more rigorous study would be valuable to develop projections of future wood and energy product demand across the Pacific Rim.

MARKET TRENDS AND OPPORTUNITIES FOR NZ'S WOOD AND BIOENERGY PRODUCTS

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Glossary

AI	Artificial Intelligence
Black pellets	Wood pellets made from wood that has been thermally treated
BW	Bin wood (stem sections; 0.8 to 1.8 m long)
ChatGPT	ChatGPT is an advanced conversational AI developed by OpenAI. ChatGPT can engage in a wide range of interactions including finding data, providing answers – including conversations aimed at refining answers, directions to sources of reports and data, creative writing, explanations, and more.
Copilot	Copilot is an AI-powered assistant designed to help with a wide range of tasks. It can help with productivity, finding information, and conduct conversations. It can help draft emails, summarize documents, answer questions, and even provide support for coding and technical issues.
CLT	Cross laminated timber
Glulam	Glue laminated lumber
g. t.	green tonne
EWP	Engineered Wood Products (e.g., CLT, LVL, Glulam, OEL™, Plywood etc.)
FAO	Food and Agricultural Organisation
FOB	Freight on Board
JAS	Japan Agricultural Standard
K grade	a specific type of log which is small diameter, short in length and has large knots
KIS grade	a log which is smaller, and has larger knots, than a K grade log
KI	a log which is similar in size to a KIS, but has slightly smaller knots
kWh	kilowatt hour
LVL	Laminated veneer lumber
M	million
m ³	cubic metre
MDF	Medium-Density Fiberboard
MPI	Ministry of Primary Industries
OEL™	Optimised Engineered Lumber™
OSB	Oriented Strand Board
RBA	longer bin wood (1.8m to 3.1m long)
SEA	South-East Asia
Sed	small end diameter
urbanisation	the rate of change in the proportion of a population that lives in urban areas, typically a move from rural to urban areas
White pellets	Wood pellets made from dried wood

Introduction

Context

New Zealand has a sustainable plantation-based forest resource of around 1.8 million hectares. Most of that resource, 90% by area, is of the introduced species, *Pinus radiata* D.Don, that produces substantially more wood than the domestic demand for logs and wood products.

New Zealand log exports have grown over the last 15 years to the point where most of New Zealand's log excess is exported. China is the dominant market for New Zealand logs, taking over 80% of log export volumes in predominantly lower grade logs. New Zealand has done well from log exports, but international markets are changing, and New Zealand is vulnerable to Chinese demand variations.

New Zealand forest growers are in a strong position but need to adapt to global trends and be strategic about planning for future opportunities. We need to find ways to diversify our forestry products, both within domestic use and international markets.

There has long been interest in how New Zealand could build resilience and diversification by increasing onshore log processing. Work to explore this has included the WoodScape study in 2011 (Jack et al, 2013), a study by Forest Economic Advisors on export growth opportunities for New Zealand processed wood (Smith, 2019), and the Forest Industry Transformation plan (MPI, 2022/23). Collectively these two studies have found there is sufficient wood resource in the long term to support expanded wood processing. Promising processing options; OSB, CLT, OEL™, large scale sawmilling aligned with biochemical and bioenergy recovery. Currently (2024) the government is funding work on increasing domestic log processing under the banner of the Wood Processing Growth Fund. This fund has a focus on long lived wood products such as sawn lumber, EWP, furniture, remanufactured wood products and treated wood. Pulp, paper, fuel, and chemical products are excluded.

To ensure the future success of the New Zealand forestry industry, it is worth asking some forward-facing questions such as

- Can we utilise excess logs to a greater extent within New Zealand and for what end use?
- What wood products will have increasing demand internationally?
- Where does New Zealand have a competitive advantage?

Purpose

This report examines market trends and opportunities for wood and wood-derived energy products both nationally and internationally. The aim is to provide an overview of New Zealand's domestic wood supply and demand, and potential future wood uses, as well as current trends in wood product markets internationally. We highlight potential opportunities and make recommendations for future work.

The preparation of this report has been carried out by Scion and has been funded through the Strategic Science Investment Fund by the Ministry of Business, Innovation, and Employment for the New Zealand Government. The report is confidential and will be shared by Scion with key forestry-sector stakeholders, at their discretion.

Methodology

The data presented in this report has been gathered from a variety of sources. These include;

- Scion data on log and wood product prices and wood processing capacity in New Zealand
- Published data on log prices (AgriHQ)
- Published data on New Zealand wood availability (MPI)
- Published data on log and processed wood product exports (MPI)
- Industry newsletters, e.g., from P. F. Olsen and Innovatek's Friday Offcuts

In the final section of the report, we discuss potential future export opportunities for New Zealand wood products. The data for this part of the report was collated using AI (Artificial Intelligence) tools. Both Chat GPT and Copilot were used to find and summarise data. This provided a time-efficient approach for compiling information on a range of countries on topics such as population, urbanisation, forest area and log production, log and wood imports and exports, etc. The results provide a preliminary analysis of international market opportunities to be validated and further investigated in due course.

We have assumed that future trade is most likely to be with Pacific-Rim countries in close geographical proximity to New Zealand, including Australia, Indonesia, Malaysia, Vietnam, Korea, Japan, China, Taiwan, etc. However, some attention has also been given to Europe, Scandinavia, Russia, and countries and regions that supply large volumes of wood products to New Zealand's largest trading partners. For example, Russia exports sawn lumber to China and Canada exports logs to China. Another region with potential is the Middle East and North Africa (MENZ), although this region has proven difficult to access in the past.

Content

The report is organised into five main sections that consider the following: New Zealand's domestic log excess projections, the dominance of the Chinese market for New Zealand's log exports, domestic energy markets, international wood markets, and, finally, potential export opportunities.

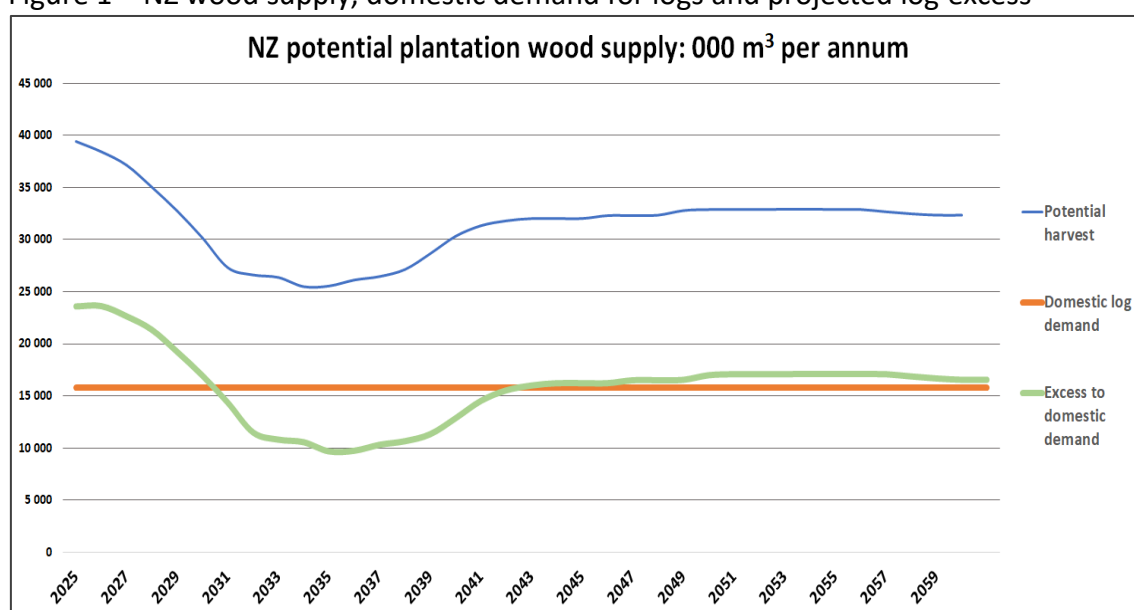
Domestic Log Excess

This analysis summarises New Zealand’s current and projected log supply, by grade and year, and looks at New Zealand’s domestic log demand.

Log Excess

New Zealand’s potential wood supply from *Pinus radiata* plantation forestry is shown in Figure 1 (Ministry of Primary Industries, 2021). This shows estimated wood supply assuming scenario three (split non-declining yield) in the MPI wood availability forecasts. The variation in wood supply is driven by historical variation in planting rates and the subsequent area due for harvesting (see Appendix A, Figure A.1).

Figure 1 – NZ wood supply, domestic demand for logs and projected log excess



Source data: MPI 2024.

Figure 1 also shows the domestic demand for logs, based on 2024 primary wood processing demand (Scion database). Domestic processing is estimated to be around 15.7 M m³ per annum, although this figure will drop closer to 15 M m³ per annum with the closure of the mills at Karioi (pulp mill) and Tangiwai (sawmill) in September 2024 and the planned closure of the paper machine at the Kinleith pulp mill in June 2025.

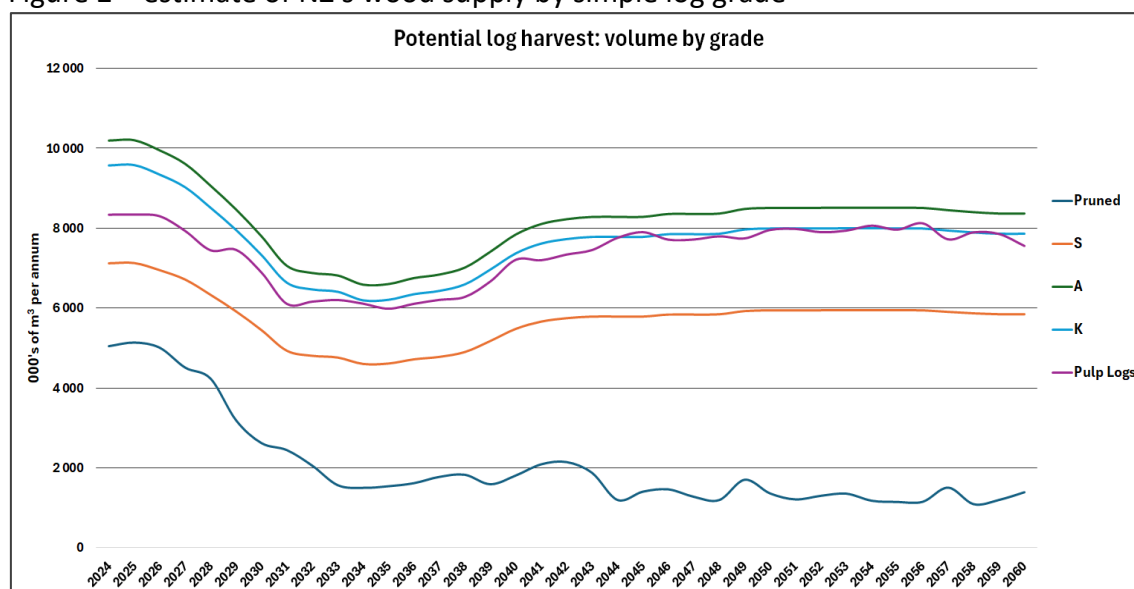
The difference between the log harvest and domestic processing demand is the implied excess volume of logs (green line). Excess volume has generally been exported as unprocessed logs, since log exports from plantation sources began in 1967. In 2023, log export volumes were over 20 M m³ per annum from an annual harvest of around 36 M m³. This makes New Zealand by far the largest exporter of softwood logs in the world by volume (FAO, 2023). The volume of harvest and excess available for export will decline until the early 2030s before recovering around 2041 to 15 M m³ per annum of exports from a total harvest of 32 to 33 M m³ per annum.

Log supply by grade

Within the total volume of excess logs, there is a wide range of log grades. An estimate of New Zealand’s expected wood supply for several key log grades is shown in Figure 2. This

is a simplification of the grades used but indicates the likely volumes of different quality logs. The line for K grade includes all the k grade variations (K, KS, KI and KIS). The different grades almost all show a declining trend in availability from 2024 out to 2034, and then an increase in volume out to 2041 where most of the log grades settle on a relatively steady volume. The grade that does not follow the total log supply trend is the pruned logs, which decline quite rapidly out to 2034 and then with some variation in supply continue to decline slowly out to 2060. The decline in pruned log supply is from roughly 5.0 M m³ per annum in 2024 to around 1.4 M m³ per annum by 2050. These volumes largely reflect pruning decisions already taken and cannot change substantially until around 2055 as it will take 28 to 30 years before current pruning decisions affect volumes.

Figure 2 – estimate of NZ’s wood supply by simple log grade



Data source: MPI 2021 and log grade split from crop modelling (Prad Calc)

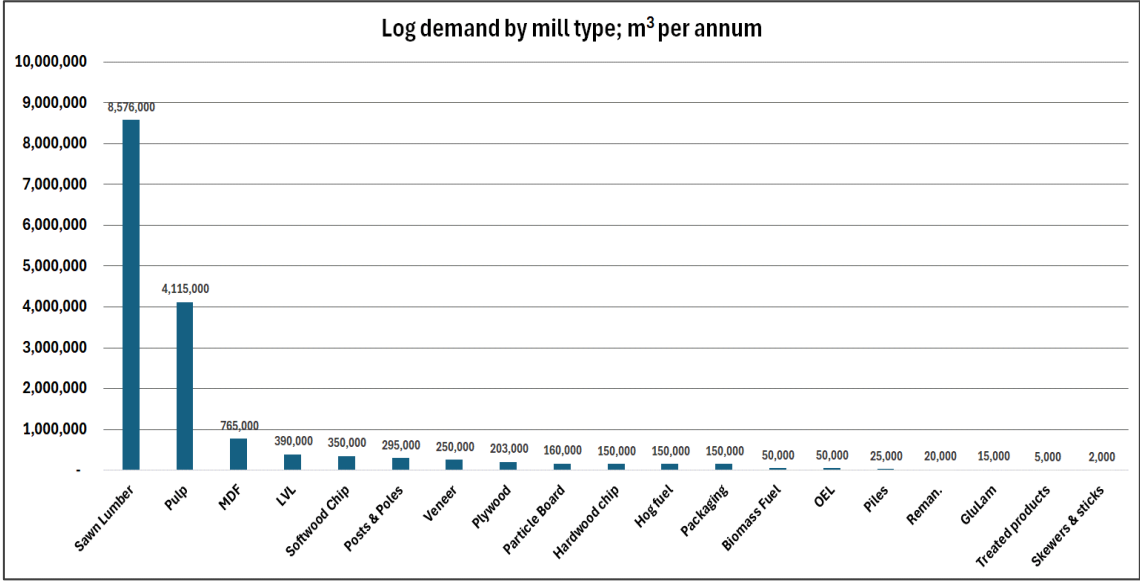
Log Demand

New Zealand’s demand for logs for processing, by product type, is shown in Figure 3 (Scion wood processing database). The major demand is for saw logs (54%) and chemical and mechanical pulp (26%). However, the demand for pulp may decline over the next 12 months due to the expected closures noted above. All the values in Figure 3 are for logs and do not include the volumes of chips and other sawmill residues that are transferred to other mills (sawmill chip to pulp or MDF mills). These non-log volumes are substantial, around 25% of the sawlog volume. MDF takes another 5% of the logs with 2.5% going to LVL. Chip exports take 2.2%. All other uses are around 1.0% or less each.

At the current level of domestic processing, New Zealand’s demand for many wood products is met, with some of the processed wood being exported (e.g., as sawn lumber, pulp, MDF, chip and remanufactured lumber etc.). The exception is pruned logs that have declining supply volumes and may be insufficient to meet domestic demand. A critical point is that to get the Pruned, S and pulp grade logs that the New Zealand wood processors want, we also get the A and K grades in larger quantities than domestic processors can consume.

Further regional analysis of supply versus processing demand would provide more detailed insights.

Figure 3 – m³ per annum of log demand by processing type (2024)



Summary

The future projections of log potential harvest and the historically limited change in volumes processed in New Zealand (Figure 1) suggest that New Zealand will continue to have significant log excess. There is likely to be around 10 million cubic meters of logs, predominantly in lower (A and K) grade logs with small volumes of better-quality grades, that are not required by current domestic wood processing operations. Therefore, we must find a market for the A and K grades either as logs or as processed products.

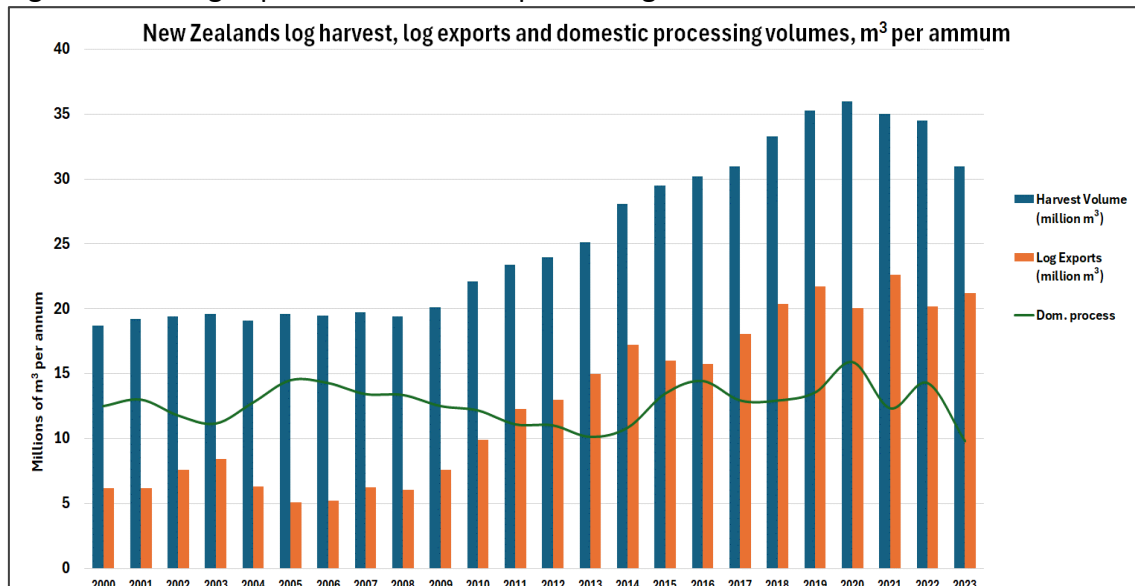
Log Export Trends

In this section, we consider New Zealand's wood export trends including the dominance of China as the major market for New Zealand logs.

Log exports

Over the last few years, New Zealand has exported a significant proportion of its annual log harvest as unprocessed logs, as shown in Figure 4. This export volume has been up to 68% of the total harvest volume. The volume processed domestically has remained relatively static, so the proportion of the total harvest processed domestically has dropped. The number of processors has dropped, with several sawmills closing over the period 2007 to 2013. Some of the remaining sawmills (e. g., Red Stag, Sequal Lumber, CHH Wood Products - Kawerau) have increased production as a response to this.

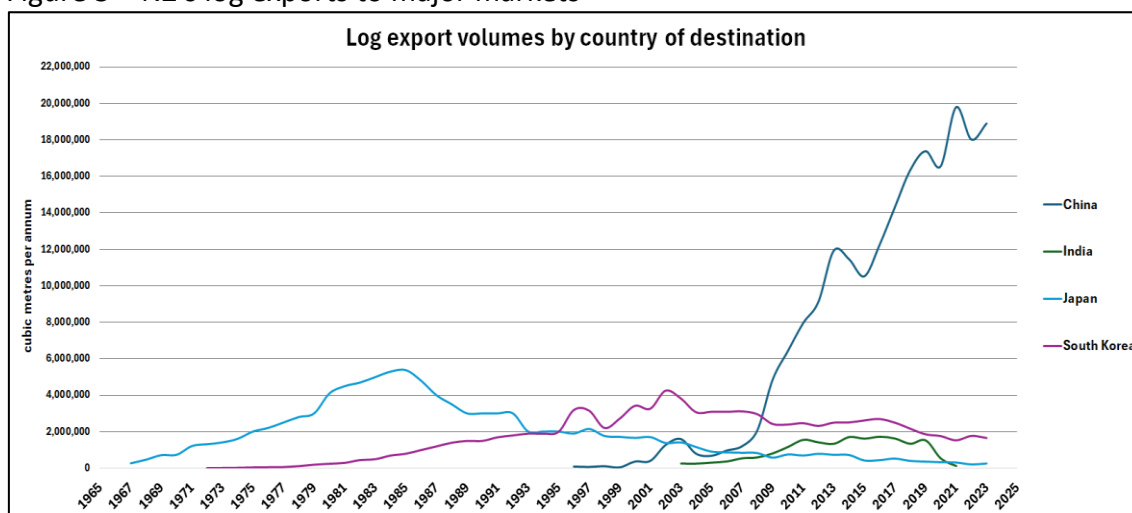
Figure 4 – NZ log exports and domestic processing



New Zealand has been an exporter of logs from its exotic forests since 1967, as shown in Figure 5. Over that period, the log export market has become increasingly important to the forest-growing industry, especially since 2009, when log export volumes to China rose significantly. New Zealand has become heavily dependent on the Chinese log market with exports to China being 80 to 90% of the log export volume over the last 5 years (89% in 2023) and around 50 to 55% of the total New Zealand forest harvest. The other main log markets such as Japan, South Korea and India have all had small declines in volume recently, contributing to China's increasing dominance in the New Zealand export log market.

The bulk of New Zealand's log export volume is currently A and K grade (66%) with some KI and KIS (another 27%). Pruned logs are around 7%, but this could be expected to drop as pruned log supply decreases (Jack et al, 2013).

Figure 5 – NZ's log exports to major markets



Log prices

The dominance of New Zealand log exports to China makes the forest industry exposed to the Chinese log market. Log prices for export logs have been trending downwards over the last 4 years, as shown in Figure 6. A-grade logs were selling for on average \$128 per green tonne (g. t.) delivered to a wharf in November 2020 (\$150 inflation adjusted), while today they are selling for \$125 per g. t. KIS logs have a similar trend, with a 2020 price of \$89 per g. t. (\$104 inflation adjusted), and a 2024 price of \$83 per g. t. S-grade logs in the New Zealand market have been much more stable, failing to match inflation but only dropping slightly since November 2020 (see Appendix A, Figure A.2).

Figure 6 – NZ's log prices for A and K grades

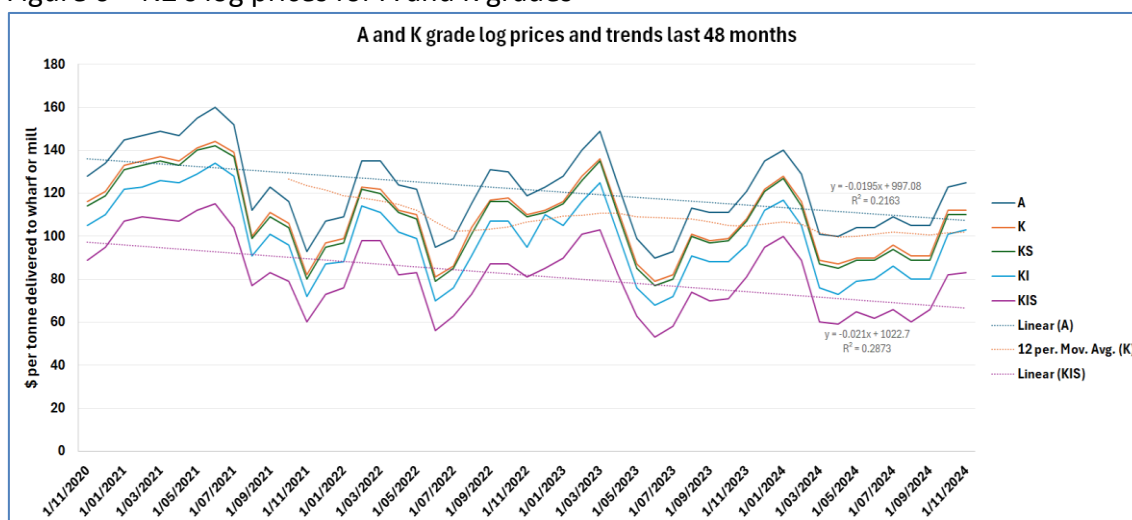
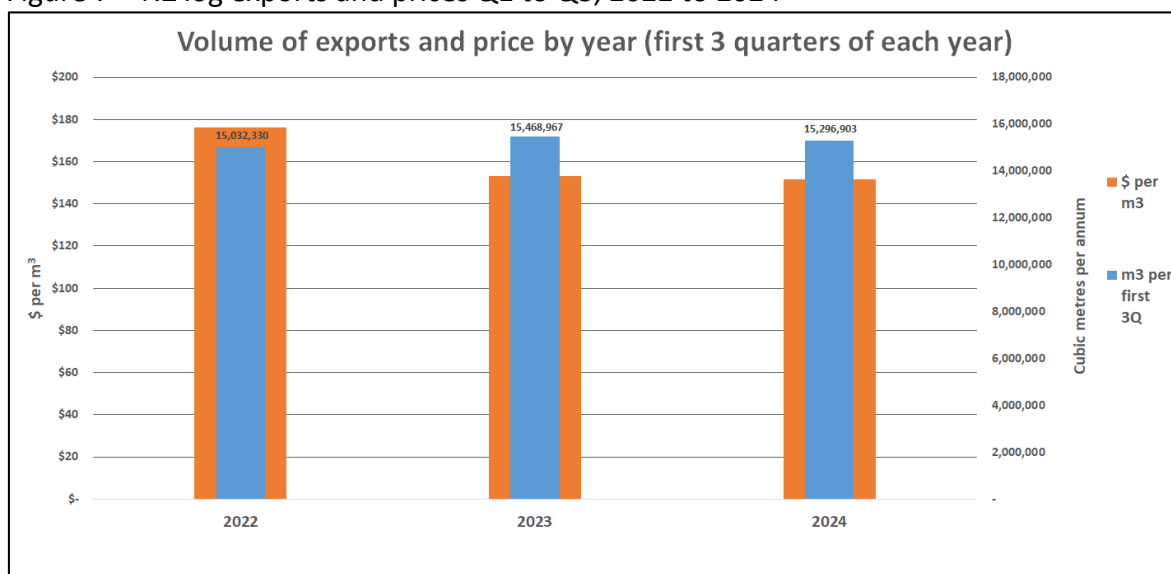


Figure 7 shows the volume of logs exported in the first three quarters of each of the last three years. The fourth quarter was omitted as we only have data for the first three quarters of 2024 at the time of writing. The average export log price is also shown. While the average log price has dropped substantially from \$176 per JAS m³ to 153 per JAS m³ (13%), the volume of logs being exported has risen slightly. There may be a Cyclone Gabrielle effect (February 2023) where the logs from the Lake Taupo Forest blow-down needed to be harvested and exported quickly, but the indication is that the volume of exports sold is (or at least was) inelastic in response to prices. This indicates that the New Zealand forest industry is a price taker for lower quality export logs. Perhaps this is not

unexpected since New Zealand currently has limited domestic markets for lower quality logs.

Figure 7 – NZ log exports and prices Q1 to Q3, 2022 to 2024

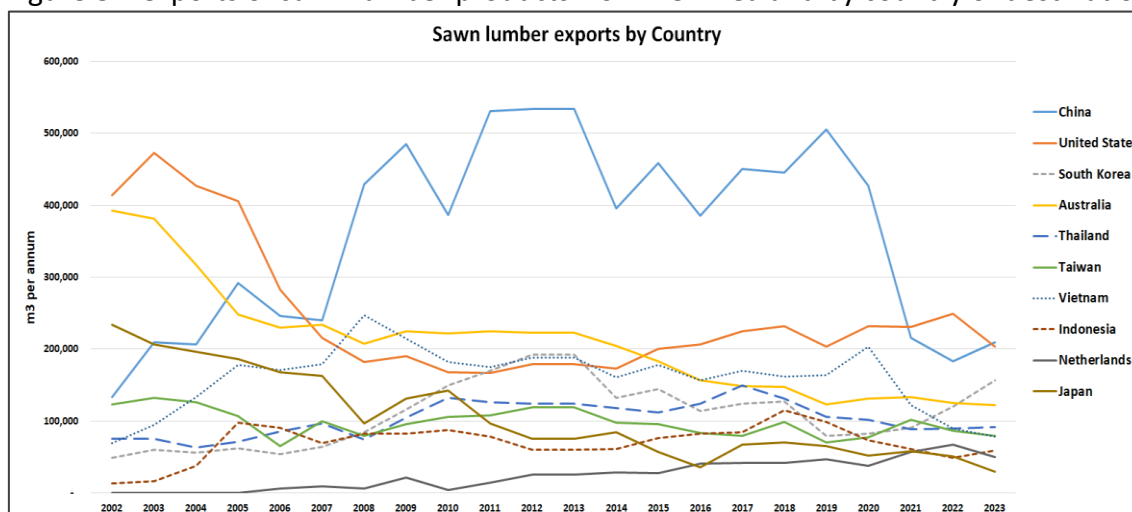


The vulnerability of New Zealand forestry exports to external markets, particularly China, and price fluctuations has been well known for the last 5 to 10 years. The impact of that vulnerability has been felt particularly in late 2024 when a very large and long-term player in the log market substantially reduced its log demand and prices crashed (Figure 6) causing significant issues for the forestry industry in New Zealand. Finding alternative domestic uses and diversifying international markets beyond China for A and K grade logs would provide more stability for New Zealand forest growers.

Lumber exports

As well as exporting logs, New Zealand exports timber products, although in far lesser volumes. Sawn lumber exports are shown in Figure 8. The volumes going to China have dropped substantially in the last 2 years whilst most other markets have remained steady and volumes to South Korea have increased slightly. Despite a steady decline in lumber volumes going to Australia over the last twenty years, they are still our fourth largest market.

Figure 8 – exports of sawn lumber products from New Zealand by country of destination



Domestic Energy Markets

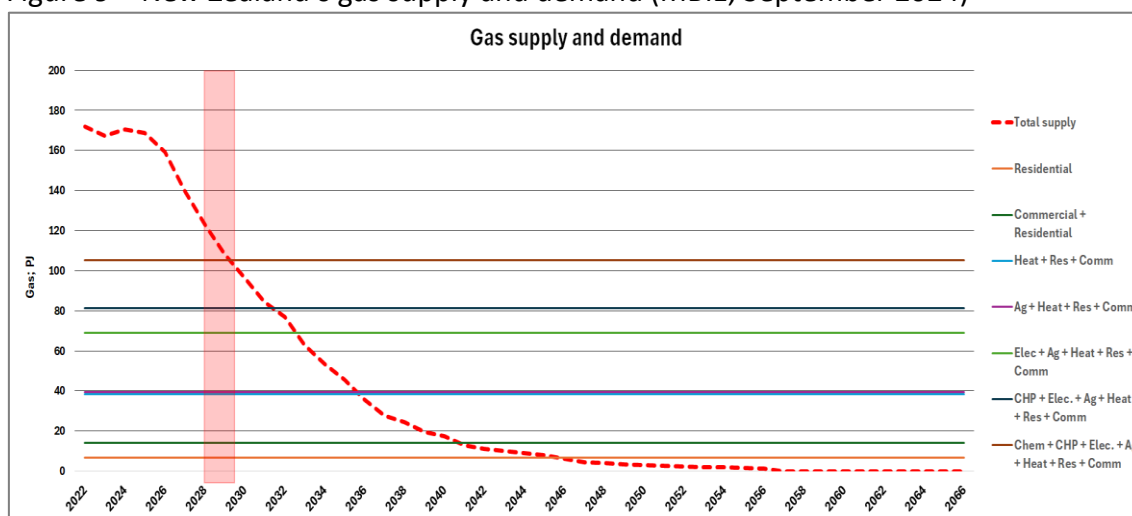
Here we explore New Zealand's domestic energy market trends and to what extent our wood resources could be used to meet our national energy needs.

Fossil energy trends

Significant changes are expected in New Zealand's domestic energy markets in the coming years. As New Zealand seeks to reduce its greenhouse gas footprint, one of the directions it is taking is to reduce the use of fossil fuel. New Zealand has a policy intent to ban new low- and medium-temperature coal boilers and phase out those in use by 2037. There is also going to be a decline in domestic gas supply.

Figure 9 shows New Zealand's total gas supply from existing fields (November 2024 red dotted line) and the accumulating demands of various users (domestic, commercial, industrial heat, electricity generation, and chemical production for fertiliser and methanol). The vertical bar shows when (~2029) supply declines to the point where it no longer meets demand. From the vertical bar forward, there is a growing energy gap as gas supply declines, provided demand remains the same. This implies an increasing demand for other forms of energy that could be electricity or wood but cannot be coal (due to regulation) and is unlikely to be gas – at least in the next 10 years. By 2040, New Zealand may need to substitute for more than 80PJ of energy currently derived from gas.

Figure 9 – New Zealand's gas supply and demand (MBIE, September 2024)



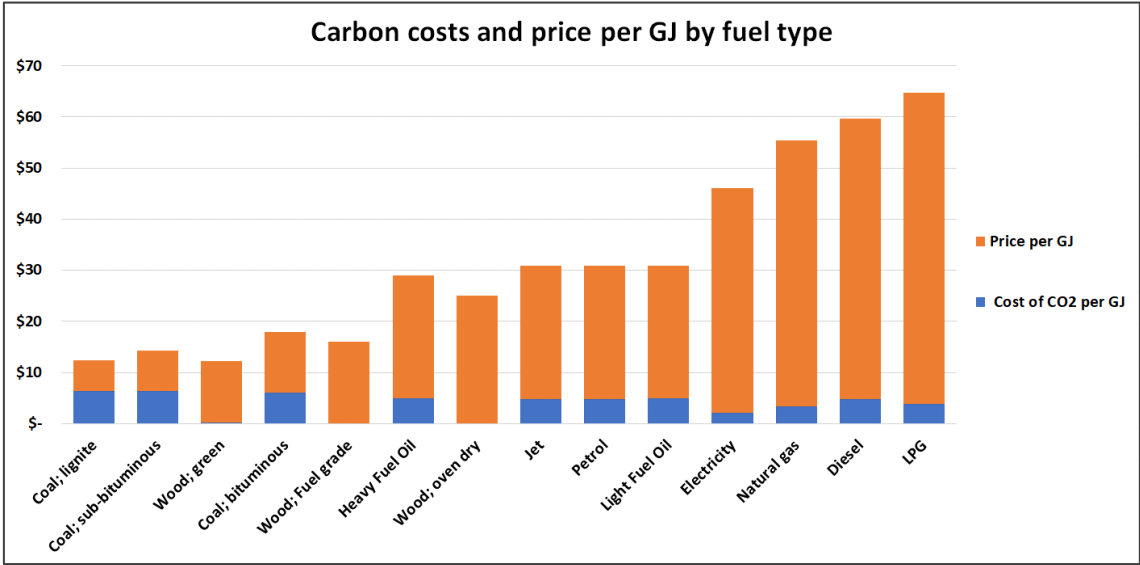
*Graph excludes approximately 2.5PJ per annum of natural gas discoveries announced in December 2024 (Turangi field).

Fuel Costs

It is also expected that the cost of carbon-based fuels will rise. Figure 10 shows the cost of various fuels and the amount of carbon cost in those fuels as of November 2024, when the carbon price was \$63 per tonne of CO₂-e. There is a carbon component to the cost of wood fuels, but it is so small that it does not show clearly on the graph. Some fossil fuels have a very low proportion of the fuel cost as carbon, as they are an inherently expensive (LPG, Natural Gas, Diesel). The carbon cost in electricity is low in New Zealand due to our high levels of renewable electricity, although electricity is an expensive source of energy. On the other hand, coal is cheap, but the cost of carbon is a large part of the full delivered

energy cost. This makes coal price vulnerable to increases in the cost of carbon. In the long run, coal is a fuel that is going to be regulated out of the New Zealand market under current legislation. This will leave wood fuels as one of the cheaper sources of energy with a low vulnerability to changes in carbon costs.

Figure 10 – price of fuels and the cost of carbon by fuel type



*Electricity priced at \$0.16 kWh

The domestic demand for wood fuels is expected to increase as the combined effects of carbon price, ban on coal boilers and increasing gas price (driven by declining supply – Figure 9), along with volatile electricity prices drives industries with a demand for process heat to consider alternatives. Biomass fuels such as chip or hog are cost competitive with many other options, especially for industrial heat in the absence of coal (Figure 10).

Wood for Energy

The energy gap that is expected to be left by gas and coal, as well as the shift away from fossil fuels, provides an opportunity for wood to play a larger role in supplying New Zealand’s domestic energy demands. New Zealand’s demands for a range of fossil fuels are shown in Table 1. These are also shown as a tonne of wood equivalent, considering the conversion losses to go from wood to another form of energy (e.g., liquid fuels). Further, a proportion of the demand that might be reasonably met by wood in the medium term (10 to 15 years) was also estimated (Table 1). This allows for some of the demands, for example coal to heat, to be substituted by electricity. The total amount of wood that could be needed is estimated at around 8 million tonnes.

New Zealand has a wide range of wood biomass resources (Hall, 2024), at costs that vary depending on type and location. Table 2 shows the total amount of lignocellulosic biomass estimated to be reasonably recoverable and available in New Zealand (Hall, 2024). The total supply is estimated at around 7.5 million green tonnes. Projected estimates of biomass availability out to 2053 are given in Appendix A, Table A.1. This data suggests there is sufficient biomass to make a serious contribution to getting New Zealand industry and transport off fossil fuels and onto renewable biomass-based fuels.

Table 1 – Fossil fuel demands, wood volume equivalents and estimates of the proportion of those demands that could be met from wood.

Fuel Type	PJ p.a.	Energy demand source	T of coal	T of wood equivalent	Estimate of Future proportion met with wood	Tonnes of wood
Coal	7.71	Electricity	367,143	1,101,429	50%	550,714
	7.47	CHP	355,714	1,067,143	0%	-
	2.07	Lime / Cement	98,571	295,714	100%	295,714
	16.52	Industrial heat	786,667	2,360,000	50%	1,180,000
	0.53	Transport*	25,238	75,714	100%	75,714
	34.3		1,633,333	4,900,000		2,102,143
Gas	29.56	Electricity		4,222,857	25%	1,055,714
	12.58	CHP		1,797,143	0%	-
	23.77	Chemicals		3,395,714	0%	-
	24.15	Heat		3,450,000	50%	1,725,000
	90.06			12,865,714		2,780,714
Fuel oil	0.59	Industrial heat		84,286	50%	42,143
	0.47	Commercial heat		134,286	50%	67,143
	0.71	Domestic transport		202,857	50%	101,429
	1.71	International transport		488,571	50%	244,286
	3.48			910,000		455,000
Jet	21.71	International Transport		5,002,304	20%	1,000,461
	15.03	Domestic Transport		3,463,134	50%	1,731,567
	36.74			8,465,438		2,732,028
Total a				22,139,000 a		8,069,885
Total b				27,141,000 b		

*Largely heritage steam engines such as trains and boats. Total a includes only domestic Jet demand while Total b includes all Jet demand.

Table 2 – total biomass resource by type in NZ (2024)

Biomass type / source	Biomass: g. t. p. a.*
Forest Residuals	2,800,000
MWW	200,000
Orchard & Shelterbelts	180,000
Straw	250,000
D fir thin	100,000
Wood chip	500,000
Pulp logs	700,000
KI & KS	2,800,000
Total	7,530,000

*Green tonnes per annum

New Zealand's wood resources include forest residuals such as landing residues (short log offcuts) and binwood (BW or RBA) which are stem sections too short to fit on a conventional log truck (BW: 0.8 to 1.8m long, RBA: 1.8 to 3.0 m). The lower grade logs (including binwood¹) could be used to meet some of New Zealand's energy demand, especially that currently met by coal (34.3 PJ equivalent to 5.0 M m³ of logs) and gas (91 PJ equivalent 13.2 M m³ of logs). However, some binwood pieces are quite large, with a diameter of 50 cm and lengths of a metre or more. Instead of using this for pulp/MDF chip, it could be segregated by diameter and length for higher value uses including;

- EWP using the larger pieces for sawing into laminates and finger jointing
- box and pallet manufacture
- landscaping products (solid wood, treated products such as edging, half-rounds, pegs, fence palings etc).

The New Zealand market for wood fuels has been developing over the last few years, supported by government regulations aimed at reducing coal use and the now defunct Government Investment in Decarbonising Industry (GIDI) fund ([EECA, 2024](#)). The wood fuels used include hog fuel, chip, mill residues and wood pellets. The increase in wood fuel use because of the projects supported by the GIDI fund (2021 to 2023) is estimated at around 270,000 green tonnes per annum. Other large projects at various dairy factories and meat works have accounted for around 305,000 tonnes of green wood, over the period of 2020 to 2024. Therefore, around 570,000 tonnes of wood waste have displaced fossil fuels (diesel, coal, natural gas) across New Zealand since 2020 (See Appendix A, Table A.2).

The domestic demand for solid wood fuels is expected to continue increasing, although the rate is uncertain. New Zealand currently has wood pellet manufacturing capacity of around 280,000 tonnes per annum of white pellets across 5 sites, up from around 40,000 tonnes from 3 sites in 2007. There is also the potential for large demand for black pellets emerging in New Zealand, driven by interest from Genesis Energy (Huntly Power Station) and Fonterra, although this may be some years away. We have sufficient (7.5 M g.t.) low cost and quality residues and logs (KI, KS and KIS) to manufacture up to 4.3 M tonnes of wood pellets and so could meet domestic demand while also being a significant supplier in the global market under the right price conditions. Changes to the pulp and paper industry could mean larger volumes of pulp logs being available to other uses, including wood pellet manufacturing.

There are also potential emerging demands for liquid biofuels from marine and aviation transport. Woody biomass from residuals is being considered as a biofuel feedstock. Although likely to be a domestic demand in the first instance, New Zealand production could be drawn into international use if we have supply available here, as ships and aircraft on international routes refuel in New Zealand.

The rate of development of the biofuels market from a potential to an actual is a key issue. Given the vulnerability of the New Zealand pulp wood processing industry with recent mill closures and possible rationalisations (OJI Kinleith), having an alternative market for low grade logs domestically seems worthwhile. Meeting our decarbonisation goals and energy demands, as well as growing regional employment and GDP, provide reasonable justification to encourage biofuel development in New Zealand.

¹ Binwood is estimated at around 2% of total recovered volume. On a national harvest volume of 30 M m³ per annum this would be 600,000 m³ per annum or 4.14 PJ.

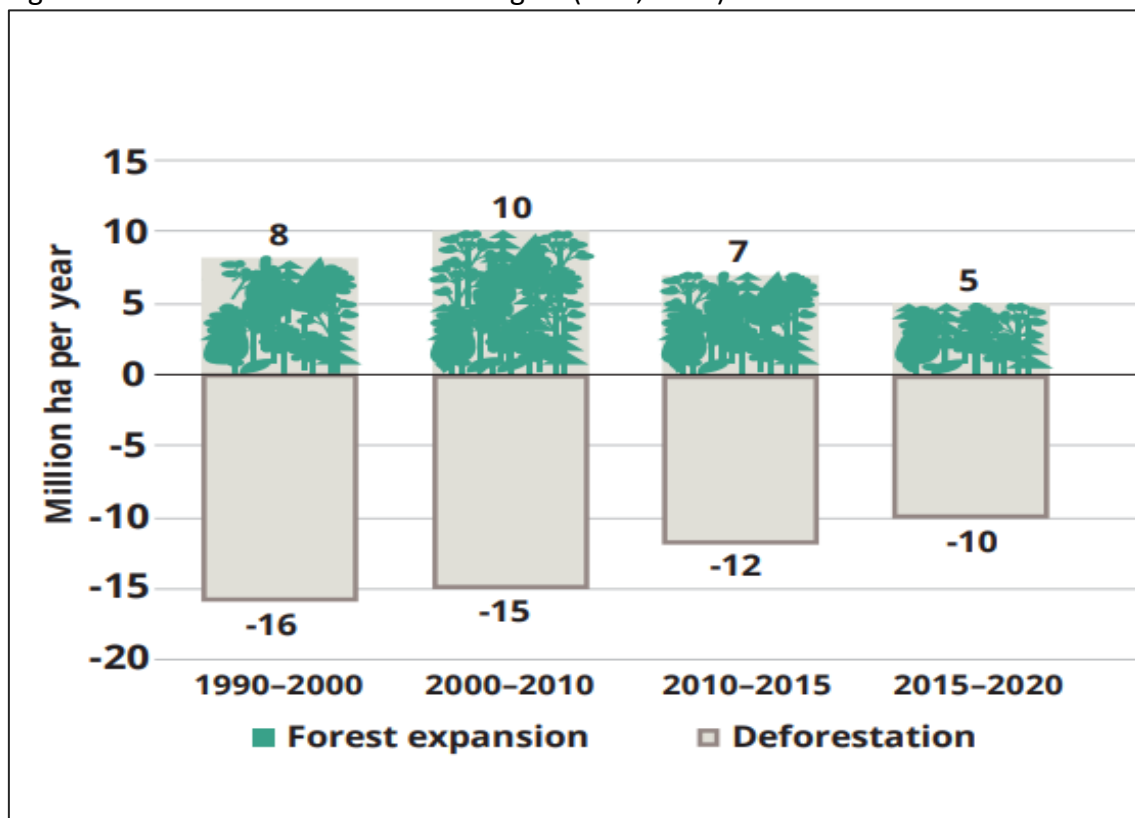
International Wood Markets

In this section, we explore international trends in wood supply and demand. We look at international wood production and focus specifically on our main trading partners. We consider both logs and lumber as well as pellet markets.

Global deforestation

Globally, there is an ongoing loss of forest area as forest expansion and regeneration is outweighed by deforestation. Figure 11 shows a loss of forest area of around 180 M ha over the last 24 years (6 to 7 M ha p.a.). Drivers of forest loss or future loss of volume from forests come from a range of factors, some of which are difficult to predict precisely. For example; Ukraine's 10 M ha of forests have been damaged and are at further risk due to war. Many tropical forests are experiencing temperature change where 40% of recorded temperatures are outside the range previously recorded. Loss of forest area to fire varies hugely from year to year but Australia, Canada, Russia and the USA have all had substantial losses of forest area in the last 5 years.

Figure 11 – Global forest area loss and gain (FAO, 2020)



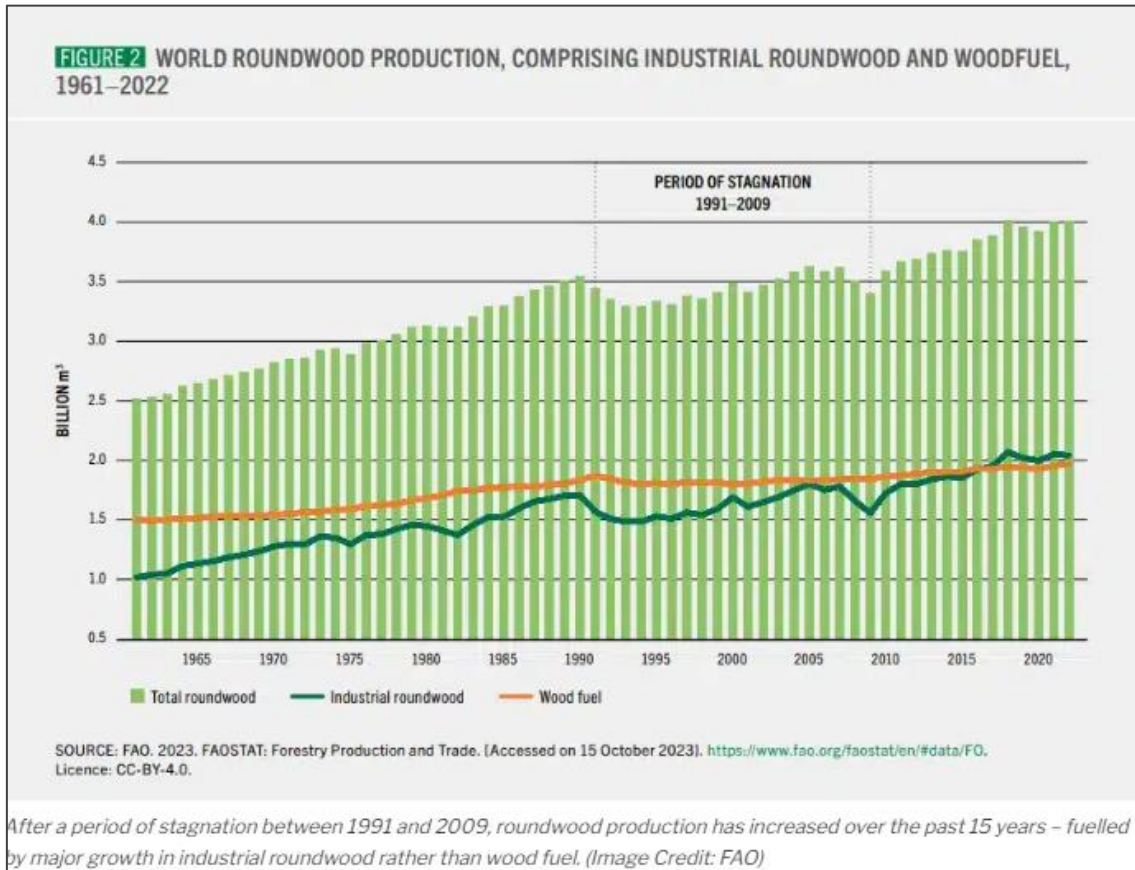
Log and lumber markets

There has been an international trend towards increasing demand for wood for both processing and energy. This is shown in Figure 12 (FAO Statistics). Whilst these increases are not dramatic, the trend is steadily upward over a long period of time (60 years).

China is one of the world's largest importers and consumers of timber due to its construction industry. China is by far New Zealand's largest market for log exports, and a significant market for lumber (see Log Export Trends). Although New Zealand is a small

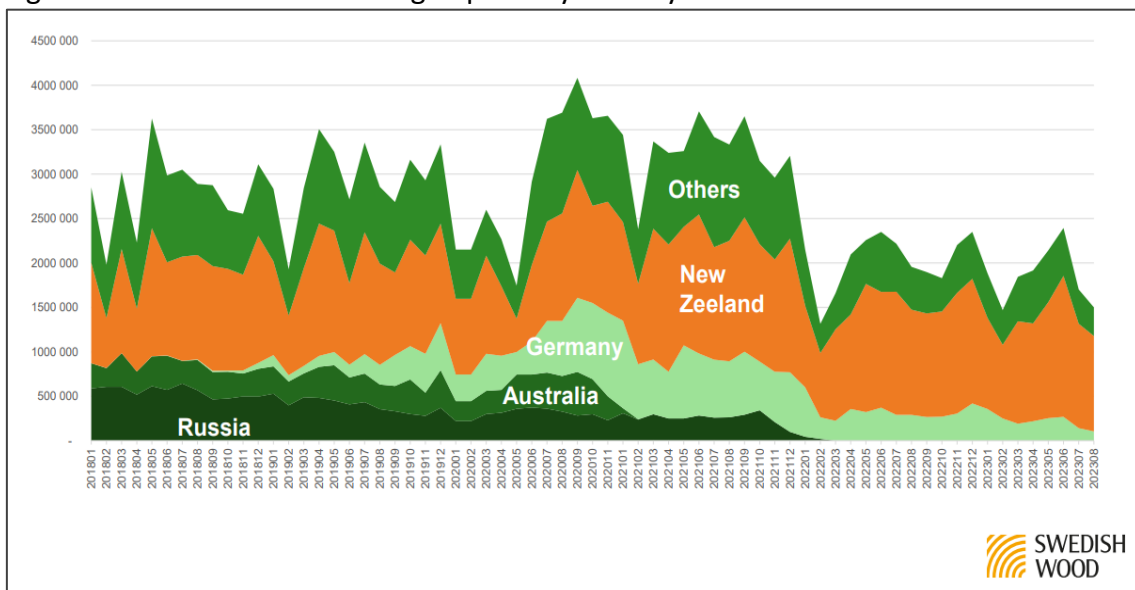
producer of logs compared to countries such as USA and Canada, we have a major share (70%) of Chinese softwood log imports. This is shown in Figure 13. The recent downturn in China's demand for logs is expected to continue with China's softwood log supply forecast to increase by 2 M m³ per annum between 2022 and 2030 (Pastila, 2023), meeting more of its own demands.

Figure 12 – Global wood production (FAO statistics)



*Industrial roundwood includes all log types going to wood processing

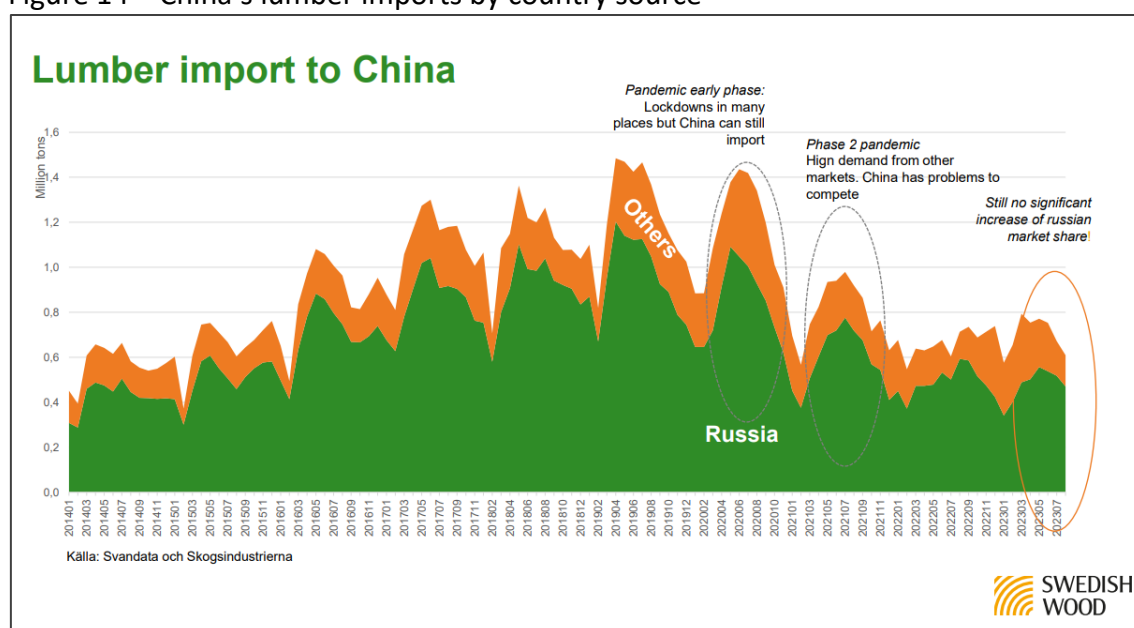
Figure 13 – China's softwood log imports by country



Source; Fridholm M. Senior Advisor, Swedish Wood. Market update – China. 71st International Softwood Conference Vienna 2023, 11th –12th October

Softwood lumber imports going to China are shown in Figure 14. Unlike log imports that mostly come from New Zealand, most of China's sawn lumber imports (75%) currently come from Russia. China's domestic production of sawn lumber has dropped substantially in recent years (FAO, 2023). Its internal consumption of sawn lumber has also dropped. This is reflected in the reduced demand from China for imported sawlogs. The Chinese lumber market is expected to decline from around 30 M m³ per annum in 2023 to 17 M m³ per annum in 2029 due to reduced house construction activity. Despite this decline, there is potential at least on a volume basis for New Zealand to compete in the Chinese lumber market and the volume demanded may increase again around 2035 (Gavin Hao, per comm. 2024).

Figure 14 – China's lumber imports by country source



Source; Fridholm M. Senior Advisor, Swedish Wood. Market update – China. 71st International Softwood Conference Vienna 2023, 11th –12th October

New Zealand exports a similar amount of lumber products to the USA (see Figure 8). Demand from the USA for lumber, EWP and Remanufactured wood from New Zealand's range of products is expected to remain steady for the next couple of years based on current and projected housing statistics. Housing starts in the US are shown in Figure 15. In 2023 this was around 200,000 m³ per annum of product with a FOB value of \$280 M (MPI, 2024).

British Columbia is one of the main suppliers of lumber products to the United States. However, there has been a decline in supply of softwood logs from British Columbia, as shown in Figure 16. This has been driven by significant volume loss from insects and fire over the last 20 years. The current British Columbia harvest volume is below their annual allowable cut (AAC), as much of the wood that is potentially available for harvest under the AAC is in remote areas that requires new roading and will have long transport distances and therefore higher costs. Further, there are now more administrative hurdles to accessing forest to harvest than previously (Neilson pers. comm., 2024).

Figure 15 – US housing starts

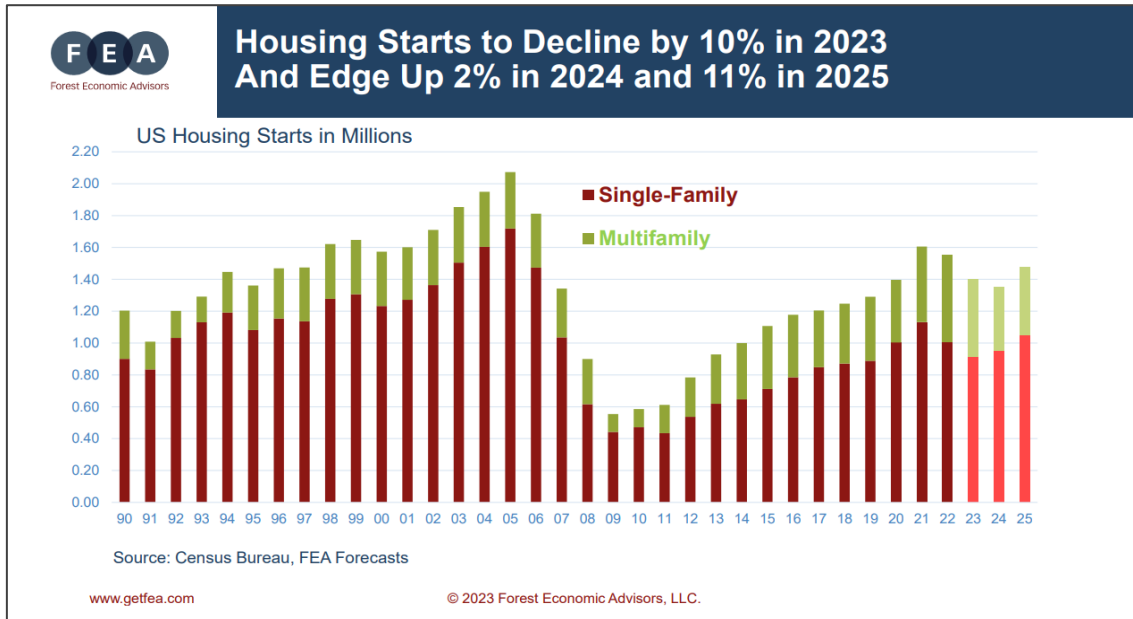
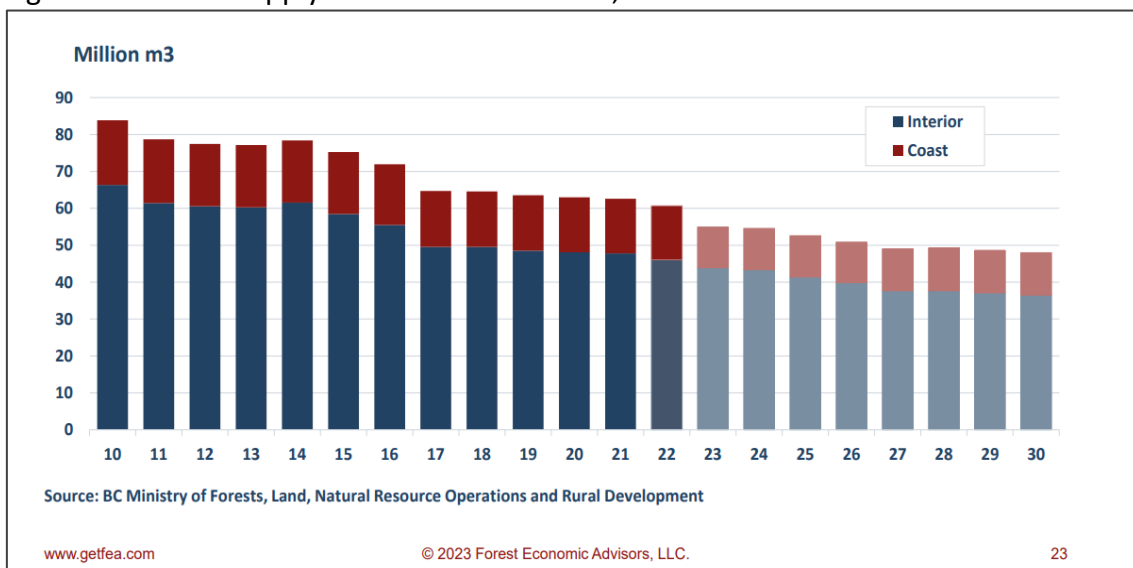


Figure 16 – wood supply from British Columbia, Canada



Source: Jannke P. (2023). North American Lumber Markets. Forest Economic Advisors. 71st International Softwood Conference Vienna 2023, 11th –12th October.

Examples of changes to wood product trade

Sawn lumber production from many European and Scandinavian countries is dropping. However, consumption in these counties is decreasing even faster – meaning they are looking to export (Jobstl, 2023).

The USA is also selling more softwood lumber into South-East Asia (SEA), where wood is being used increasingly in construction of residential buildings. This is a potential market for New Zealand exports (see next section Export Opportunities).

Japan takes 300,000 m³ of softwood lumber per month, with their imports from North America declining from 550,000 m³ / month in 2012.

Comments from sawmilling industry representatives suggest they expect to see increasing demand from the USA, South Korea, and Taiwan and declining volumes going to China and Vietnam.

Russia is dumping timber and plywood into Asia, Latin America, and Africa as European and North American markets are unavailable due to sanctions. This loss of markets has been compounded by recent Russian expansion of capacity. Birch plywood capacity is around 5.2 M m³ per annum and growing (total plywood capacity is 5.7 M m³). However, production is around 3.2 M m³ due to sanctions in some markets. China is taking some (0.25 M m³ p.a.) and India is as well. Africa has a demand of 2.5 M m³ p.a., with Egypt the largest single market in North Africa.

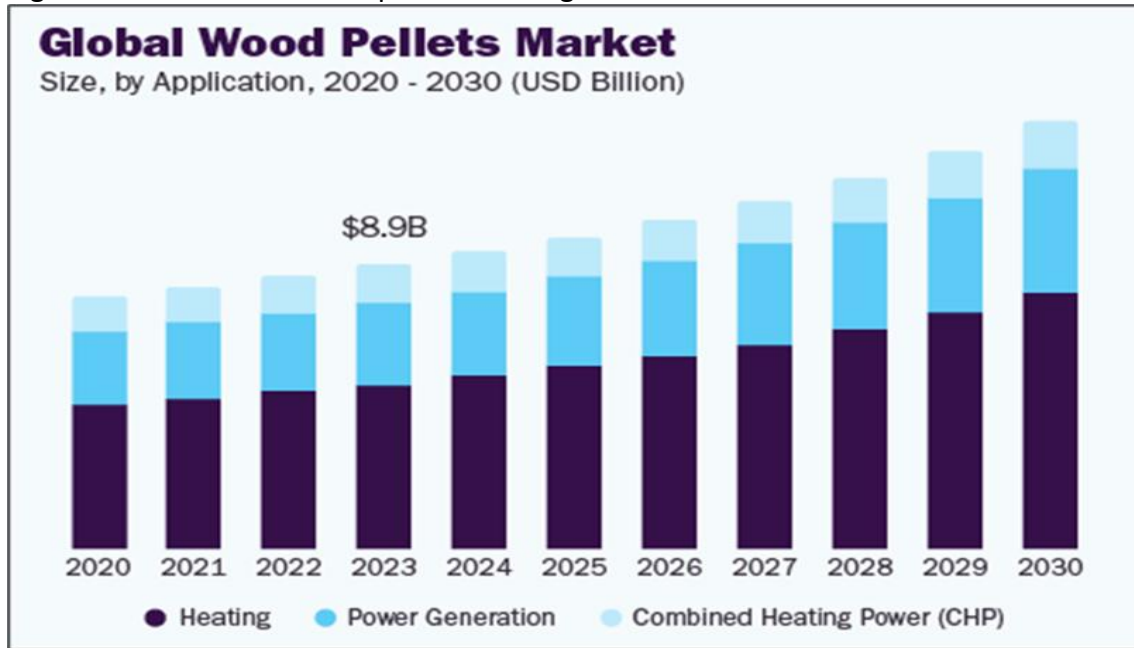
Global wood products trade is complex and is facing considerable uncertainty due to the imposition in early 2025 of tariffs by the USA on trading partners such as China, Canada, EU countries and Mexico. The impacts of these are as yet unclear and some wood products are exempt – further analysis of the impact of these tariffs is warranted – but not possible at this stage as the exact level of the tariffs on what products has not been settled.

The impact of trade tariffs imposed on Canadian lumber going to the USA are yet to be seen as they have only very recently been imposed (5/3/2023). However, it is possible that the volume of Canadian lumber, EWP and remanufactured wood products going to the USA will decrease. These trends could favour New Zealand as the US looks to other suppliers, including New Zealand, for increased lumber product imports.

Pellet Markets

International markets for densified solid fuels, particularly pellets, are also growing. Figure 17 shows that the global wood pellet market will grow by US\$4.3 billion, or around 15.5 million tonnes of pellets, between 2023 and 2030. This is largely due to growing demand in Asia, including China, South Korea, Japan, and up to 3 million tonnes per annum from Taiwan over the next 5 to 10 years as they seek to decarbonise electricity production (Wood Pellet Association of Canada, 2024).

Figure 17 – estimated wood pellet market growth

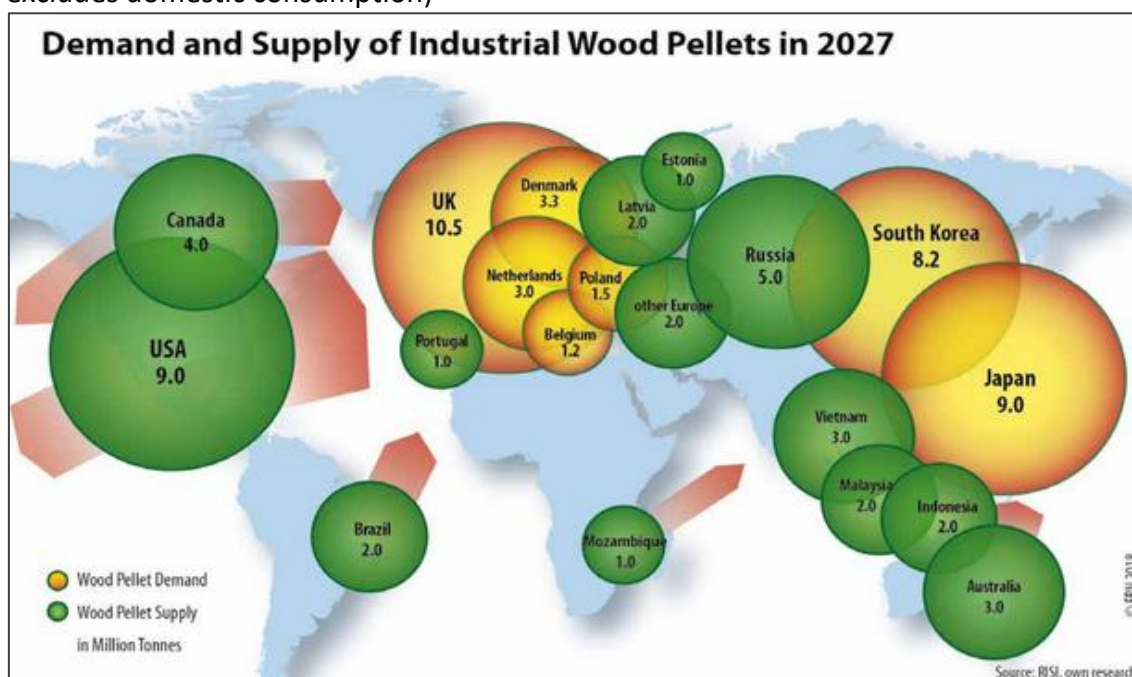


Source: Grand View Research. (2024). Wood pellets market.

The caveat is that much of the global pellet demand is from thermal power generation plants currently running on coal. As coal is cheap, unless the price of wood pellets is low, the power produced will be expensive, meaning that there will be downward pressure on the price of pellets. At a pellet price of NZ\$15 per GJ, the electricity produced from them will be in the order of \$0.27 kWh. On the plus side, there may be competition to buy wood pellets from several countries which may increase the price.

Figure 18 shows the major importers and exporters of wood pellets. The major suppliers in close geographical proximity to New Zealand are Vietnam, Malaysia, Indonesia, and Australia. These producers are supplying mostly into Japan and South Korea, but also into Europe. Both Japan and South Korea also get wood pellets from Canada and the USA.

Figure 18 – major supply and demand of wood pellets (exports and imports only – excludes domestic consumption)



Source: The Echo, (2020).

Global Timber shortage

A combination of increasing international demand for wood products and deforestation trends means that a global timber shortage is a risk. Rising demand is expected to continue due to growing interest in wood as a sustainable construction material for housing and infrastructure and as a renewable source of energy (bioenergy) and biodegradable packaging (biomaterials). Deforestation for agriculture, urban expansion, and illegal logging is reducing timber availability, and reforestation efforts have not kept pace with deforestation (see Figure 11). Unsustainable forestry practices outstrip natural regeneration in some regions and climate change impacts such as pest infestations (e.g. bark beetles in North America) and natural disasters (including cyclones, hurricanes, floods, droughts, and wildfires) can drastically reduce forest production. Shifts towards forest conservation also have potential to limit timber production in the short term.

If current trends continue, the impact of a timber shortage may be felt by mid-century (2040-2060). Mitigation measures could reduce or delay shortages and include the universal adoption of sustainable forest management practices, greater use of recycled materials and non-wood alternatives in construction, and large-scale reforestation and afforestation (planting new forests).

Timber shortages are likely to be felt more quickly and acutely in regions that are highly dependent on imports, have limited domestic forest resources, are affected by the impacts of climate change, and/or overharvest or mismanage their forests. The likelihood of timber shortages by region are detailed in Appendix A, Table A.3. In summary, Southeast Asia, Sub-Saharan Africa, and parts of South America (Amazon basin) are most vulnerable to timber shortages, potentially within the next decade or two. Of those, Southeast Asia is the closest region to New Zealand geographically. Northern Europe, New Zealand, Canada, and Chile are less likely to face shortages as they have sustainably

managed forests and excess supply. New Zealand is projected to be in a good position to both meet its own wood fibre demands as well as having a significant volume to sell into overseas markets (see Figure 1).

Export Opportunities

There is an increasing focus on wood being sourced from sustainable sources and New Zealand's plantation pine forests fit the criteria for sustainable production (e.g., Forest Stewardship Council, Programme for the Endorsement of Forest Certification). By transforming raw logs into finished or semi-finished goods, New Zealand can diversify its forestry sector, generate higher export revenues and create jobs while contributing to global sustainable development goals and aligning with global demand trends for prefabricated materials. This has been a goal of the industry and government for many years, and it has largely not happened. Some key questions that need to be addressed are around the barriers to expanded wood processing in New Zealand. In the past this would appear to be due to a lack of substantial identified markets, leading to no viable business case for the investment required. In this final section, we analyse new international export opportunities for New Zealand's sustainable wood products. Results in this section have been collated and summarised using AI tools and as such are preliminary and require validation. A full set of questions and detailed responses are presented in Appendix B. Further analysis of the barriers to exporting greater volumes into SEA is required.

Wood Availability by Country

We primarily consider countries on the Pacific Rim and how they compare for wood supply. Data on population size, population growth rates, urbanisation, urbanisation growth rate, GDP, projected GDP growth and forest area have been collated (see Appendix A, Table A.4). Based on this data, a potential wood demand index (WDI) incorporating population, GDP per person (GDP pp), GDP growth (GDPg), urbanisation (Urb%) and domestic wood supply per person (WSpp) was created (Eq. 1).

$$\text{Eq. 1. WDI} = (((\text{Pop} \times \text{GDPpp} \times \text{GDPg}) / \text{Urb\%}) / \text{WSpp})$$

This is summarised in Table 3 and allows insights into which countries could be potential, or potentially larger, markets for wood products in the future based on their likely demand for wood products and their ability to meet that demand from their own sources. The WDI used here may not be capturing all the relevant factors in estimating wood demand – including historic and cultural preferences. Further work on this topic is suggested.

Table 3 – Potential wood demand index

	Wood demand Index	Imports logs from NZ?
Singapore	150,000,000	Y
Hong Kong	11,515,152	Y
India	2,234,685	Y
China	966,814	Y
Philippines	407,813	Y
Mexico	329,259	N
Taiwan	355,020	Y
South Korea	190,244	Y
Indonesia	164,519	Y
Vietnam	125,641	Y
Thailand	92,548	Y
Australia	43,081	Y
USA (West Coast)	31,500	Y
Japan	28,361	Y
Malaysia	17,436	Y
Chile	3,527	N
Canada (West Coast)	1,034	N

Singapore has an extremely high value as it has a very high GDP per person and no domestic wood supply of any note. China and India are also unsurprisingly high on the list, based on large populations which are still urbanising. Several of the South-east Asian countries show potential for wood imports, e.g., Indonesia, Vietnam, Philippines, Thailand and Malaysia. These countries and Mexico, have higher wood demand index than the USA and Australia, which are both currently significant markets for New Zealand wood products.

Existing markets including the USA, Australia, Japan, Korea and China will continue, but potentially with a decline in volume going to China (see International Wood Markets).

Canada and Chile have low ratings as they have significant domestic wood supplies and well-established wood processing industries.

Region-Specific Product Demand

Different regions have different wood product demands depending on their own wood use context. A summary of New Zealand export opportunities by country for wood products is shown in Table 4. A tick with light green shading indicates an existing market, and darker green shading indicates a new opportunity that could be explored. Beyond logs, there are opportunities in Remanufactured wood products, EWP, Veneers, OSB, MDF, densified wood fuels, furniture and prefabricated building interior components. Many of these opportunities exist in Pacific Rim countries in Southeast Asia, for example; Indonesia, Malaysia, Thailand, Philippines, Singapore and Vietnam. These countries have a combined population of around 600 M people. The region-specific demand drivers for EWP are as follows:

- Singapore: High-rise construction, green building initiatives, and reliance on imports.
- Vietnam: Urbanization and strong export-oriented furniture industry.
- Thailand: Prefabrication and tourism infrastructure.

- Indonesia: Large housing needs and infrastructure growth.
- Malaysia: Growing construction sector and interest in lightweight alternatives.

Malaysia has significant domestic wood resources and a low wood demand index (see Table 3). However, it does have potential as a new market option for New Zealand's solid wood products because they do not have domestic supplies of softwoods. They have significant amounts of Palm oil wood from plantation turnover, but this wood is not well suited to solid wood processing. They have a large remanufacturing industry and already take some logs from New Zealand. Both Indonesia and Malaysia are potential importers of softwoods despite having significant forest industries. They may be interested in certain specialized wood products and timber types due to specific industry needs, limitations in domestic production of certain wood types, or gaps in local supply chains. These opportunities are detailed in Appendix A, Table A.5.

Beyond the Pacific Rim, there is also potential to export to the growing market in the Middle East/ North African (MENA) countries such as Saudi Arabia, Egypt, and others. Saudi Arabia is about to launch major construction effort (Gigacities) and will need products (lumber and plywood) for concrete form work as well as EWP (Ross 2024). They will probably not want logs as they have no timber processing industry of scale and very limited domestic timber supplies. US\$50 billion of construction is expected over the next 10 years in MENA countries (Ebner, 2024). Therefore, a possible option is for New Zealand and Australian solid and engineered wood product exports to the Middle-East. Further, this infrastructure programme will also require large amounts steel, at the same time as there is increasing pressure to decarbonise steel making, where bio-carbon is one of the options.

Many of the countries listed as potential export destinations already take wood products from New Zealand – the point of the list is about future demand based on population and the ability of these countries to meet their wood demands (especially softwoods) from internal supplies.

Many will import wood products from other countries as well as New Zealand, just as NZ, whilst it has a massive oversupply of softwoods (exporting 20 M m³ per annum of logs alone) imports a range of wood products from a wide range of countries (#126 in 2024).

We also export wood products to around 130 countries. However, some countries take tiny quantities and a few take very large quantities. The top 20 export destinations for NZ wood products make up 96% of the market (MPI, 2024) with China accounting for 53%. An important issue being to identify which of those many countries is significant as a future market.

Table 4 – summary of opportunities for NZ wood product exports

Country / Region	Raw Logs	Sawn Lumber	Finger jointed & Mouldings	Engineered Wood (LVL, CLT, Glulam)	Plywood & Veneers	OSB	Wood Pellets & Biomass	Paper & Pulp	Furniture & components	MDF	Prefabricated Construction Components
China	✓	✓		✓	✓	✓		✓	✓	✓	
India	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Vietnam	✓	✓			✓	✓		✓	✓	✓	
South Korea	✓	✓				✓	✓	✓		✓	✓
Japan	✓	✓	✓	✓	✓	✓	✓			✓	✓
Australia	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
USA and Canada		✓	✓	✓		✓			✓	✓	✓
Malaysia	✓	✓	✓	✓	✓	✓		✓	✓	✓	
Indonesia	✓	✓		✓	✓	✓		✓	✓	✓	
Thailand	✓	✓		✓	✓	✓		✓	✓	✓	
Philippines	✓	✓		✓	✓	✓			✓	✓	
Middle East		✓		✓	✓	✓			✓	✓	✓
Taiwan	✓	✓		✓	✓		✓	✓		✓	
Mexico		✓		✓	✓	✓		✓		✓	✓

A summary of international markets for each of the key wood products in Table 4 is given briefly here.

- Engineered Wood Products (EWP) (e.g., LVL, Glulam, CLT): Strong demand in USA, Canada, Europe, Japan, South Korea, and Australia due to green building trends. Southeast Asia (Singapore, Malaysia, Vietnam, Thailand, Indonesia) emerging as a potential growth market for CLT and LVL.
- Plywood and Veneers: High demand in China, Vietnam, India, the Middle East, USA, and Europe for construction and furniture applications.
- Wood Pellets and Biomass Fuels: Demand driven by carbon reduction goals in Europe (Germany, Netherlands, UK), Japan, and South Korea.
- Paper and Pulp Products: Major importers include China, India, Southeast Asia, USA, and Europe due to growing e-commerce and packaging needs.
- Finger-Jointed Timber and Mouldings: Strong markets in Australia, USA, Europe, and Japan, particularly for ready-to-install construction materials.
- Prefabricated Wooden Components: Key growth in Japan, South Korea, Australia, and Europe, where modular and earthquake-resistant housing is expanding.
- Furniture and Finished Goods: Premium markets in USA, Europe, China, India, and the Middle East favour eco-friendly and high-quality wood furniture.

Squared Logs

Squared logs, sometimes called big squares or square cants, are partially processed logs that could appeal to specific markets looking for higher-value or semi-finished wood products.

There is potential to expand production and export of squared logs, and this might align with the New Zealand forestry sector's broader goals to add value to exports. However, the market context is nuanced and competitive, with China being the largest potential market based on current log volumes and its past intake of the LumberCube product. Squared logs are also being sold to Japan for reprocessing into packaging lumber.



It is essential to evaluate the logistics, pricing, and market preferences in target countries like China, India, and others (SEA) to assess the viability of this product category. The competitiveness of such products against alternatives like fully processed lumber, veneers or raw logs also influence demand. Exploring partnerships with buyers in emerging markets or those with specific construction and manufacturing needs could be worthwhile. Understanding trade policies, shipping costs, and environmental standards in these markets is crucial.

Best Use Strategy

New Zealand's wood harvest is more than currently needed for domestic uses. A decision needs to be made about how to use this log excess. The options are to export as logs or to expand processing domestically either for domestic use or higher-value exports. The best use of resources should occur due to market forces. However, markets, technology and knowledge change over time and the best use may change, requiring marketing strategies and processing priorities to change. If the resource exists as logs, then the material is best used as a fuel or fuel processing feedstock in the form of chip or hog fuel, if there is an available market.

Wood pellets are best made from wood processing residuals such as sawdust rather than logs, as the primary processing does most of the generation of the small particles (sawdust etc.) required for wood pellet manufacture and pays for the logging and log transport, making the process more financially competitive with fossil fuel-based alternatives. In the long term, bioenergy may not be the highest value for wood residues, and it may be worth considering processing options that are energy plus other products (wood pellets + wood molasses, biochar + wood vinegar, bio-plastics etc.) or products that do not include energy as an output.

To enable New Zealand exports, we need to be strategic in our marketing approach. To maximize New Zealand's competitive advantage, the key considerations are

- Sustainability: The renewable and sustainable nature of *Pinus radiata* products can be highlighted to align with global sustainability initiatives.
- Regional Specialisation: High quality products (e.g. veneers, EWPs) are most appropriate for Europe, USA, and Japan while cost-competitive products (e.g., plywood, biomass) are a better fit for China, India, and Southeast Asia.
- Technology Innovation: Investing in efficient processing and advanced manufacturing facilities is essential for competitiveness.
- Branding: New Zealand's reputation for high-quality, sustainably managed forest products can be emphasized.

For log exports, it's also important to consider

- Market requirements: Specific log dimensions and qualities required in each country.
- Target markets: Rising demand for softwood logs in India, Vietnam, and the Philippines etc., could be good market opportunities.
- Transportation costs: Focus on countries with accessible ports and lower shipping distances from New Zealand.
- Value-added potential: Some markets may prefer semi-processed products like wood chips or veneers instead of raw logs.
- Trade barriers: Review tariffs, phytosanitary requirements (methyl bromide fumigation or heat treatment), and any other import policy changes or restrictions in potential markets.
- Destination Diversification: China and India are the most promising large-scale markets, but diversifying to Southeast Asia and other regions would help reduce reliance on a single or limited number of destinations.

- **Product Diversification:** Explore processed timber exports (e.g., veneer, plywood, engineered wood) to avoid raw log restrictions. This also strengthens the forestry industry by reducing market risks and creating domestic economic benefits.
- **Partnerships:** Build strong local partnerships to navigate licensing and import requirements.

Conclusions

The global demand for wood, particularly for energy, is increasing, driven by the shift toward sustainable and eco-friendly energy sources. Specifically, the demand for densified solid fuels, such as wood pellets, is expected to grow significantly in coming years, with Taiwan alone anticipated to require up to 3 million tonnes per annum for decarbonising its electricity production.

New Zealand has the capacity to significantly expand its wood pellet production, with sufficient resource to allow manufacture of up to 4.3 million tonnes per year. However, this potential is contingent on favourable market conditions and pricing, as well as the availability of residuals and low-grade logs for pellet production.

The demand for wood pellets around the Pacific Rim for bioenergy is increasing, with China, South Korea, Japan as well as Taiwan driving demand. In New Zealand, there is also potential for a large increase in demand for both white and black pellets, driven by domestic low-carbon energy transition goals and interest from major users like Genesis Energy and Fonterra.

New Zealand has ample residual biomass resources that could be harnessed for liquid biofuels, wood pellets, and solid wood fuels such as chip. As the country seeks to reduce its dependence on fossil fuels, particularly coal, these biomass resources could play a crucial role in meeting energy demands, with an estimated 8 million tonnes of wood potentially needed to meet medium-term demands for renewable energy production.

The increasing cost of carbon, particularly for fossil fuels like coal, creates a competitive advantage for wood fuels, which have lower carbon costs. As coal becomes less viable due to regulation, wood fuels will be one of the cheaper energy sources available, especially for industries requiring process heat.

New Zealand's domestic market for wood fuels is developing, particularly in the industrial heat sector, as coal and gas prices rise, and government regulations push for alternative energy sources. The use of biomass fuels like wood pellets, hog fuel, and chips is becoming increasingly cost-competitive for industrial heat, particularly in the absence of coal.

As natural gas supply in New Zealand is projected to decline significantly by 2030, there will be an increasing gap in energy supply. This situation will likely drive further demand for alternative energy sources, such as electricity and wood fuels, to meet energy needs.

Beyond bioenergy there are significant opportunities for New Zealand's export logs to go to new markets and potentially for New Zealand to expand its onshore wood processing to manufacture softwood products for the Southeast Asian market.

While global forest loss continues, with deforestation outweighing reforestation, New Zealand with its sustainable wood supply, which is well in excess of domestic demand, could capitalize on emerging markets in Southeast Asia and potentially in the Middle East.

The declining average price for export logs from New Zealand, both short and long term, highlights the vulnerability of the log export market, particularly to China. New Zealand needs to explore alternative markets for its A and K grade logs to mitigate the impact of fluctuating prices and shifting demand from traditional markets.

Further, having a domestic outlet for these logs (or some of them) may help to mitigate issues that occur with large windthrow events such as from Cyclone Gabrielle where the supply of logs exceeded local processing capacity for some log grades.

New Zealand's wood export market is facing challenges due to declining demand from traditional markets like China. However, opportunities exist in new markets such as Southeast-Asia. New Zealand's export of logs is highly dependent on China, but with China's increasing self-sufficiency in softwood log supply and sluggish demand in 2024/25, New Zealand may need to diversify its log export markets. Opportunities lie in Indonesia, Malaysia, Thailand, Philippines, Vietnam and in increased volumes going to India.

The demand for engineered wood products such as CLT and LVL is expected to surge, especially in regions like Southeast-Asia and in Saudi Arabia, driven by large-scale infrastructure projects like the development of Gigacities. This highlights the growing importance of timber in the global construction sector, which is increasingly driven by sustainability goals. Whilst the Middle-East is also a potential market for wood-based construction and fittings, the market is largely untested and in its early stages.

A global timber shortage remains a real risk (or opportunity), with global demand rising due to factors such as population growth, urbanisation, and increased use of wood in construction, bioenergy, bioproducts and biodegradable packaging materials. Climate change and deforestation are significant threats to the stability of timber supplies, especially in regions like Southeast Asia, Sub-Saharan Africa, and parts of South America.

Southeast Asia is vulnerable to timber shortages. Rapid deforestation, illegal logging, and climate change are exacerbating pressures on forest resources.

In the face of increasing demand and environmental threats, sustainable forestry practices are essential. New Zealand, with well-managed plantations and sustainable practices, is in a strong position to meet both domestic and international timber demands.

New Zealand's plantation pine forests are well positioned to meet domestic demand for timber and provide a significant volume of exports, especially as global wood shortages loom. Countries on the Pacific Rim, such as China, South Korea, and Japan, are already key markets with substantial demand for wood products, including timber for construction and engineered wood products.

Southeast Asia: Despite significant local forest industries, countries like Indonesia and Malaysia are likely to continue importing softwood, engineered wood products, and wood pulp due to limitations in domestic production. These imports will support growing construction and furniture industries in these regions, which increasingly demand wood products for both structural and decorative uses.

Some opportunities for New Zealand's wood products, both logs and processed materials are summarised below. These are;

- Raw Logs: Key markets for logs are China, India and Southeast-Asia, where logs are used for pulp, plywood, and construction materials.
- Engineered Wood Products: High-value markets like Europe, USA, Japan, and Australia demand engineered wood products for sustainable construction. Southeast-Asia is also a market that could develop for EWP.

- Plywood & Veneers: Mass-market potential in China, India, Southeast-Asia, and the Middle East, with demand for construction and furniture manufacturing.
- Wood Pellets & Biomass: Renewable energy markets such as Europe, South Korea, Taiwan and Japan offer opportunities.
 - The domestic market for wood fuels, including white and black pellets is expected to grow
- Paper & Pulp: Significant demand from China and South Korea for industrial paper and packaging.
- Furniture: Target premium markets in Europe and the USA for high-quality furniture and mass-market options in Southeast Asia and India.
- Prefabricated Components: Growing markets include Japan, Australia, Europe, and the USA, driven by trends in sustainable, efficient construction.

Accelerating the biofuel market transition from potential to actual is crucial. Establishing domestic biofuel industries provides an alternative market for low-grade logs and processing by-products such as sawmill chip and other residues (fish tails (from log round-up) from veneer peeling), helping stabilize the vulnerable pulpwood market in New Zealand.

Supporting domestic biofuel production aligns with New Zealand's goals of decarbonization, regional economic development, and employment growth. Utilising renewable resources for energy also reduces reliance on fossil fuels and boosts GDP through industrial diversification.

While exporting raw logs remains viable, processing these logs domestically into value-added products like engineered wood, plywood, or biomass fuels reduces reliance on highly dominant markets, such as logs to China.

Alignment with Global Trends: Emphasizing New Zealand's commitment to sustainability and leveraging its free trade agreements will enhance market access. Products meeting eco-friendly and prefabricated construction trends can gain traction in premium markets like Europe, Japan, and North America.

Regional markets have varying demands. High-quality products can be targeted at Australia, USA and Japan, while cost-effective and mass-market items suit Southeast Asia and India.

While there are opportunities for New Zealand in both domestic and international markets for wood fuels and products, there is a need for strategic diversification and increased focus on sustainable, higher-value uses of available wood resources to stay competitive. The evolving global energy market and regulatory shifts around sustainability underscore the importance of adapting to changing market conditions.

The global timber industry is facing a critical period of adjustment, with shifts in supply chains, rising demand for wood products, and environmental challenges all influencing market dynamics. Countries like New Zealand, with sustainable forestry practices and strategic positioning, are well-placed to meet both domestic and international demand for timber and wood-based products

Encouraging the development of biofuels and expanding domestic wood processing into exportable products provides New Zealand with both economic resilience and environmental advantages.

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Appendix A

In this Appendix, we provide additional supporting Figures and Tables that have been referred to in the main text.

Figure A.1 – area and age class distribution (X axis label 1) of NZ plantation forests and implications for future harvest rates (red line X axis label 2)

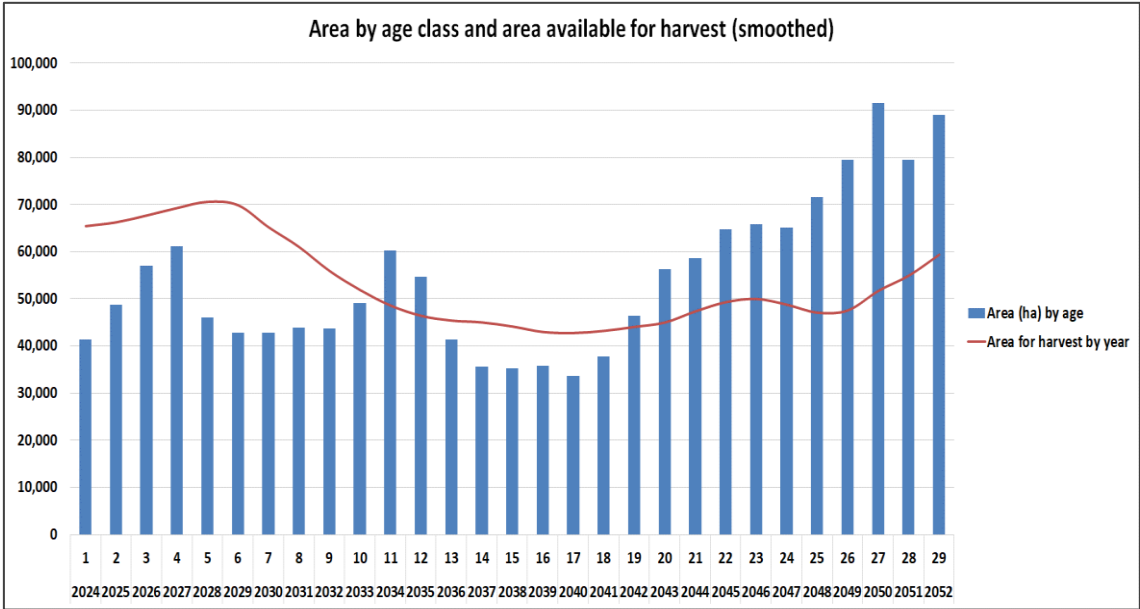


Figure A.2 – domestic log price trends

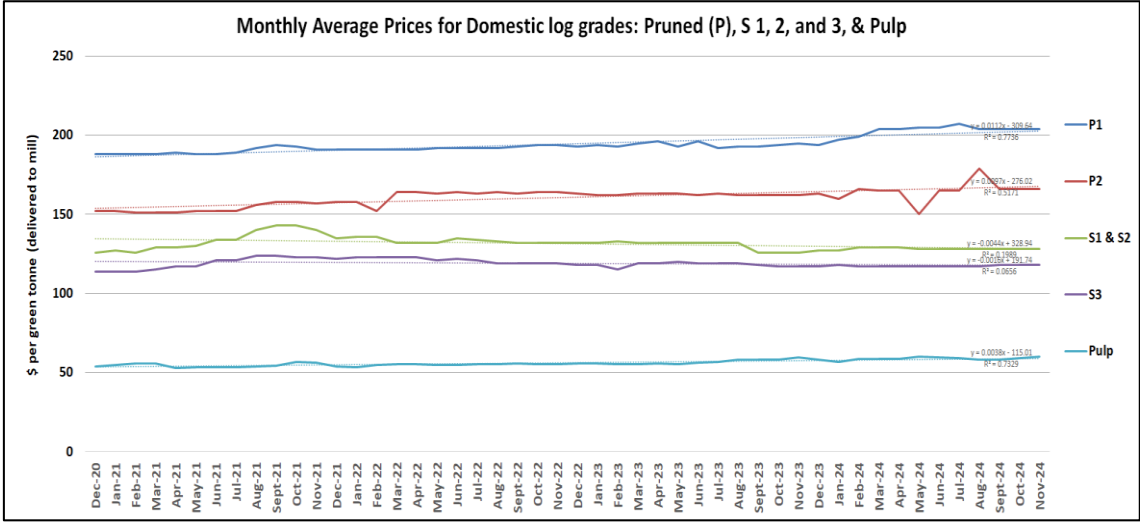


Table A.1 – National potential supply of woody biomass fuels; green tonnes per annum

	2024-2028	2029-2033	2034-2038	2039-2043	2044-2048	2049-2053
In-forest post-harvest*	3,842,944	2,785,329	2,353,087	2,387,255	2,505,697	2,971,222
MWW**	235,710	253,414	272,779	293,980	317,213	342,698
Orchard	121,511	123,942	126,420	128,949	131,528	134,158
Straw and stover	294,782	300,678	306,691	312,825	319,081	325,463
Shelter belt	81,920	81,920	81,920	81,920	81,920	81,920
Thin to waste	488,544	477,446	332,923	343,142	359,854	392,278
Production thin residues	28,732	26,328	195,881	275,250	146,012	69,047
Port bark	227,928	205,135	193,739	227,928	227,928	227,928
Prunings	13,764	61,356	34,909	19,868	14,435	13,764
Douglas fir production thinnings	438,192	470,512	101,744	108,498	-	-
Sawmill chip surplus	569,085	569,085	569,085	569,085	569,085	569,085
Pulp log (surplus to domestic demand)	2,120,926	368,845	-202,915	-101,579	21,617	257,422
KIS, etc grade logs***	4,211,674	3,247,273	2,843,215	2,953,903	3,643,362	4,497,075
Total	12,675,712	8,971,263	7,209,478	7,601,024	8,337,732	9,882,060

Table A.2 – Increase in wood fuel use 2020 to 2024

No.	Funding	Round	Who	Where	What	t, wood fuel	MWth
1	GIDI	R1	Synlait	Dunsandel	Coal to wood pellets	30,359	12.59
2	GIDI	R1	Napier Pine	Hastings	NG to wood pellets	15,845	3.94
3	GIDI	R2	Talleys	Blenheim	Diesel & Coal to wood pellets	14,578	4.99
4	GIDI	R2	Talleys	Wairoa Meat	Coal to wood	30,515	7.60
5	GIDI	R2	Hautapu Pine	Taihape	Coal to wood	10,588	2.64
6	GIDI	R2	Pioneer Energy	Washdyke	Coal to wood	42,609	10.61
7	GIDI	R3	South Pine	Nelson	Coal to wood	2,709	0.67
8	GIDI	R3	Ravensdown	Southland	Lime Kiln - converted to biomass	3,369	0.84
9	GIDI	R3	Papakura Timber	Auckland	Sawmill - gas kiln to biomass	5,094	1.27
10	GIDI	R4	Stuart Timber	Tapanuai	Sawmill coal to biomass	8,271	2.06
11	GIDI	R4	Ngahere sawmilling	Mataura	Sawmill coal to biomass	6,726	1.67
12	GIDI	R4	Donelleys	Reporoa	Diesel & coal to biomass	12,741	3.17
13	GIDI	R4	AffCO	Hamilton	NG to wood pellets	16,964	4.22
14	GIDI	R4	Gladfield Malt	Leeston	Coal to wood	10,591	2.64
15	GIDI	R4	Fonterra Hautapu	Hautapu	Coal to wood pellets	60,052	21.35
16	GIDI	R5	Hewvan Timber	Palmerston	Coal to wood	107	0.03
17	GIDI	R5	Alsco	Christchurch	Coal to wood	294	0.20
						271,409	80.49
1	Non Gidi	X	Fonterra	Te Awamutu	Coal to wood pellets	111,000	40
2	Non Gidi	X	Fonterra	Waitoa	Coal to wood chip	77,000	40
3	Non Gidi	X	Fonterra	Stirling	Coal to hogged wood	28,000	10
4	Non Gidi	X	Danone	Balclutha	Coal to hogged wood	34,000	11
5	Non Gidi	X	SFF	Finegand	Coal to hogged wood	27,000	10
6	Non Gidi	X	Fonterra	Hautapu	Cola to wood pellets	28,000	10
						305,000	121

Table A.3 – Timber supply shortages by region

Region	Key factors	Vulnerabilities	Impact Timeline
Southeast Asia	Rapid deforestation, illegal logging, agricultural expansion (e.g., for palm oil and rubber), and weak enforcement of environmental laws.	Some of the world's most biodiverse tropical forests are being cleared at high rates for the local timber industry and illegal logging.	Potentially within the next decade, by 2035, if unsustainable practices continue.
Sub-Saharan Africa	Rapid population growth, agricultural expansion, charcoal production, and illegal logging.	High dependency on timber for fuelwood and construction, but many forests are being cleared for subsistence farming and logging. Also, weak governance allows for illegal logging in some regions.	Some African countries are already facing localized timber shortages, and this could worsen significantly by 2030.
South America (especially the Amazon Basin)	Agriculture (especially cattle ranching and soy farming), infrastructure projects, illegal logging, and mining.	Deforestation rate has accelerated in recent years under policies that prioritize economic development over conservation. Forest ecosystems once disrupted take a long time to recover.	Within the next 20-30 years.
Easter Europe and Russia	Illegal logging, unsustainable forest management, and wildfires.	Illegal logging, especially in the Far East and Siberia, and wildfires burning on average 7.4 M ha per annum for the last 5 years (around 37 M ha total from a total estate of around 885 M ha) (Statistica.com)	Certain high-demand species and regions could experience scarcity in coming decades.
North America (select regions)	Climate change, wildfires, and pest infestations (like the bark beetle) are causing significant	British Columbia and California are increasingly facing challenges from wildfires and pests. In 2023,	Localized shortages of specific tree species or types of wood (e.g., softwood) could occur

	losses in forested areas, particularly in the western United States and Canada.	Canada lost 18 M ha of forest to wildfires.	within the next 10–20 years in parts of North America, though the continent as a whole is less likely to face an immediate timber crisis compared to other regions.
Europe (Southern and Eastern)	Smaller forest areas, urban expansion, agriculture, and unsustainable logging.	Wildfires (exacerbate by climate change) are frequent and countries in Eastern Europe (e.g., Romania) struggle with illegal logging.	Within the next two decades
China	China has made significant efforts to reforest its land but remains heavily reliant on timber imports for construction.	Domestic timber resources are limited compared to demands so vulnerable to fluctuations in global timber supply.	By 2030 if major supplies like Russia and Southeast Asia cut back on exports.
Northern Europe (Scandinavia)	Strong sustainable forestry practices and large forested areas.		Less likely to face timber shortages in the near future.
Canada (outside wildfire-affected areas)	Well regulated forest management practices and significant timber resources	Climate change and wildfires are potential threats in the long term.	Less likely to face timber shortages in the near future.
New Zealand	Well-regulated forest management practices and significant timber resources	Climate change and wildfires are potential threats in the long term.	Less likely to face timber shortages in the near future.
Chile	Large plantation resource (largely <i>Pinus radiata</i>) that is intensively managed.	Uruguay has around 1.0M ha of plantation forests (mostly Eucalypts and some pine) allowing exports of pulp and sawn lumber.	Less likely to face timber shortages in the near future.

Table A.4 – Data on Pacific Rim countries

Country	Population	Units	Population growth rate %	GDP, trillions of \$	GDP growth p.a. (10 years)	Urbanisation	Urbanisation change	Plantation forest area; million ha	GDP p/p	Plantation forest area p/p	Wood supply rating	Volume Grown p.a.	Wood Supply p/p	Market for NZ?	Comments
China	1.4	billion	-0.1	18.0	4%	65%	Rising (75% by 2035)	80.2	12,857	0.057	Medium	1,604,000,000	1.145714	Yes	Very large existing, but declining market
USA (West Coast)	54.0	million	0.5	4.9	3%	90%	Stable	14.0	90,741	0.259	High	280,000,000	5.185185	Yes	Existing market. Reman. Excess timber supply
Japan	125.0	million	-0.3	4.3	1%	92%	Stable, increasing	10.3	34,400	0.082	Medium	206,000,000	1.648000	Yes	Existing Market, Logs
South Korea	52.0	million	0	2.0	3%	82%	Stable, increasing	1.0	38,462	0.019	Low	20,000,000	0.384615	Yes	Existing Market, logs
Australia	26.0	million	1.1	1.9	3%	86%	Stable	2.0	73,077	0.077	Medium	40,000,000	1.538462	Yes	Excess timber supply, currently takes NZ lumber and Reman.
Canada (West Coast)	5.0	million	1	2.2	2%	86%	Slow increase (to 90%)	1.8	440,000	0.360	High	36,000,000	7.200000	Yes	Excess timber supply
Indonesia	277.0	million	1.1	1.3	5%	57%	Rising to 70% by 2035	9.6	4,693	0.035	Low	192,000,000	0.693141	Yes, Largely new	Needs deeper analysis. Has 15M ha of palm oil plantation
Vietnam	98.0	million	0.9	0.5	6%	39%	Rising	2.7	4,592	0.028	Low	54,000,000	0.551020	Yes, Largely new	Needs deeper analysis
Malaysia	34.0	million	1.2	0.4	5%	78%	Rising	2.5	11,765	0.074	Medium	50,000,000	1.470588	Potentially	Excess timber supply - an exporter of products
Singapore	5.9	million	0.5	0.5	3%	100%	Stable	0.0	84,746	0.000	Low	-	-	Potentially	
Phillippines	116.0	million	1.5	0.5	6%	48%	Rising to 60	0.8	3,879	0.007	Low	16,000,000	0.137931	Yes, Largely new	Needs deeper analysis
Thailand	70.0	million	0.3	0.6	4%	52%	Rising	1.6	7,857	0.023	Low	32,000,000	0.457143	Yes, Largely new	Needs deeper analysis
Chile	20.0	million	0.5	0.3	3%	88%	Stable	2.9	15,000	0.145	High	58,000,000	2.900000	No	Excess timber supply, mostly Radiata pine - a competitor
Mexico	127.0	million	1	1.4	3%	81%	Increasing	1.0	11,024	0.008	Low	20,000,000	0.157480	Yes, Largely new	Needs deeper analysis
India	1.4	billion	0.7	3.7	6%	38%	Rising 50% + by 2050	18.3	2,643	0.013	Low	366,000,000	0.261429	Yes	Existing market, logs ?
Saudi Arabia	36	million	1.78	1	2.7	91%	Stable	0.043	27,778	0.001	Low	860,000	0.000024	Yes, Largely new	Needs deeper analysis
Egypt	110	million	1.62	0.395	4.3	43%	Increasing	0.0	3,591	0.000	Low	20,000	0.000000	Yes, Largely new	Needs deeper analysis

Table A.5 – Wood products with export opportunities to Indonesia and Malaysia

Demand Type	Reason for importing	Use
Softwood	Tropical forests are primarily home to hardwood species and softwoods like pine, spruce, fir and cedar are scarce or not commercially viable but heavily used in construction and furniture making.	Softwoods are lighter weight and easy to handle so are used for construction, paper production, packaging materials, plywood, particleboard, furniture frames, roofing, flooring, and panelling in construction.
Wood pulp and paper	Although produced locally, certain grades of wood pulp and finished paper products may be imported to meet demands of specialized industries such as high-quality printing paper, tissue paper, and packaging materials.	Paper manufacturing for high-grade or speciality papers and finished paper products for printing, packaging, or hygiene products.
Engineered wood products	Engineered wood products (e.g., CLT, LVL and glulam) are becoming increasingly popular in construction due to strength and sustainability and may not be widely produced domestically in high volumes, especially from specific temperate wood species.	High-rise timber construction, bridges, and large architectural projects, as well as interior applications like panelling and decorative elements.
Specialty Wood Panels and Veneers	While plywood and veneers are produced domestically, specialty wood panels and veneers made from exotic or temperate species may be imported.	Imported veneers are used in high-end furniture, decorative woodwork, and interior design. Specialty plywood, MDF (medium-density fibreboard), and particleboard may be imported for construction and cabinetry.
Wood Pellets (for Bioenergy)	Despite domestic production, rising energy needs may lead to increased imports of wood pellets to diversify energy sources or meet carbon emission targets.	Power generation and industrial heating as renewable energy.
Processed Wood Components	Specialized processed wood components (e.g., doors, window frames, mouldings, and flooring) may be imported due to their specific design, quality, or material, particularly for high-end construction or renovation projects.	Luxury home construction, commercial projects, and interior design where precision and high-quality finishes are required.

Appendix B

Here we provide the AI responses to questions on uses for New Zealand's export log resource.

Q. Currently New Zealand has around 20 million cubic metres per annum of *Pinus radiata* logs that are excess to its domestic processing demands. These logs are often smaller (less than 40 cm diameter) and have larger knots than the saw logs used in New Zealand. Can you tell me which countries would be good markets for these logs?

A. Exporting *Pinus radiata* logs with smaller diameters and larger knots requires targeting markets with industries capable of using such timber efficiently. These logs are often suitable for pulp and paper production, plywood manufacturing, laminated veneer lumber (LVL), chipboard, and low-grade construction materials. Here are some potential markets for these logs:

China

- Key demand drivers:
 - High demand for wood in furniture manufacturing, construction, and packaging industries.
 - Extensive pulp and paper industries needing raw material.
 - China is already New Zealand's largest export market for raw logs, including lower-grade logs.
- Advantages: Established trade relationships, large-scale industrial processing facilities.

India

- Key demand drivers:
 - Growing construction and infrastructure sectors.
 - Plywood and panel manufacturing industries that can utilize lower-grade timber.
 - Emerging interest in LVL for structural applications.
- Advantages: Increasing demand for timber imports due to limited domestic supply.

Vietnam

- Key demand drivers:
 - Large population
 - Urbanisation occurring
 - Growing furniture manufacturing sector focused on export markets.
 - Demand for plywood and particleboard production.
 - Competitive labour costs for processing wood products.
- Advantages: Proximity to New Zealand and increasing timber imports.

South Korea

- Key demand drivers:
 - Significant pulp and paper production capacity.
 - Demand for wood chips and low-grade logs for industrial uses.
- Advantages: Mature market with established import systems.

Japan

- Key demand drivers:

- Demand for engineered wood products, including LVL and laminated beams.
 - Traditional reliance on wood imports due to limited use of domestic forest resources.
- Advantages: Strong focus on quality and efficient processing technology. Mature market with established supply chains

Southeast Asia (Malaysia, Indonesia, Thailand, Philippines)

- Key demand drivers:
 - Large population.
 - Urbanisation.
 - Plywood and veneer production industries.
 - Growing furniture export markets.
 - Construction and packaging material requirements.
 - Limited supplies of softwoods locally.
 - Need for certified wood products is growing.
- Advantages:
 - Competitive processing industries, low transportation costs due to proximity.
 - New Zealand, the Philippines and Thailand are members of the ASEAN-Australia-New Zealand Free Trade Area (AANZFTA), which facilitates trade by reducing tariffs and easing import-export procedures

Middle East (e.g., UAE, Saudi Arabia)

- Key demand drivers:
 - Growing construction industries requiring wood for formwork and scaffolding.
 - Use of timber in furniture and packaging.
- Advantages: Increasing reliance on imported wood due to very limited domestic forest resources.

Key Considerations for Export logs

- Market requirements: Need to understand specific log dimensions and qualities required in each country.
- Transportation costs: Focus on countries with accessible ports and lower shipping distances from New Zealand.
- Value-added potential: Some markets may prefer semi-processed products like wood chips or veneers instead of raw logs.
- Trade barriers: Review tariffs, phytosanitary requirements, and any other import restrictions in potential markets.
- China and India are the most promising large-scale markets, but diversifying to Southeast Asia and other regions would help reduce reliance on a single or limited number of destinations.

There are some issues to consider which may constrain some markets or make them harder to access than others. Some barriers to softwood log imports by country are;

1. India

- Phytosanitary Requirements:

- India has strict fumigation requirements for imported logs, often requiring methyl bromide fumigation before entry.
- Some ports may allow debarked and heat-treated logs as an alternative to fumigation.
- Port Entry Restrictions:
 - Log imports are allowed only through designated ports with quarantine facilities.
- High Tariffs & Import Duties:
 - India imposes import duties on raw wood logs, making processed wood products more competitive.
- Preference for Domestic Timber:
 - The Indian government promotes local afforestation and domestic wood industries, discouraging excessive log imports.

2. Indonesia

- Import Restrictions:
 - Indonesia has historically banned or restricted log imports to protect its domestic forestry industry.
- Local Timber Priority:
 - Government policies promote domestic wood processing, discouraging reliance on imported logs.
- Licensing and Bureaucracy:
 - Importers need special permits and must comply with Indonesian timber legality assurance system (SVLK) requirements.
- Phytosanitary Controls:
 - Logs must be free from pests and often require fumigation or heat treatment.

3. Malaysia

- Import Licensing:
 - Importing logs requires government approval and permits from the Malaysian Timber Industry Board (MTIB).
- Preference for Domestic and ASEAN Sources:
 - Malaysia encourages domestic timber use and prefers sourcing within ASEAN trade agreements.
- Phytosanitary Regulations:
 - Strict pest control measures and quarantine requirements for imported logs.
- Duties and Taxes:
 - Some wood products face import taxes, though softwood logs may have lower tariffs compared to processed wood.

4. Vietnam

- Strict Phytosanitary Requirements:
 - Logs must be fumigated and comply with Vietnam's quarantine regulations to prevent pest introductions.
- Preference for Processed Wood Over Raw Logs:

- Vietnam promotes importing processed timber rather than raw logs to add value locally.
- Log Ban from Some Sources:
 - Vietnam has restrictions on certain wood species and sources due to sustainability concerns.
- Complex Bureaucracy:
 - Importers must follow strict documentation and approval processes.

5. Philippines

- Import Permits & Licensing:
 - Importers must secure permits from the Philippine Department of Environment and Natural Resources (DENR).
- Phytosanitary and Fumigation Requirements:
 - Logs must undergo fumigation or heat treatment to prevent pest infestations.
- Local Wood Protection Policies:
 - The government encourages local timber production, which can limit import growth.
- Tariffs & Costs:
 - Import taxes and port handling costs can increase the total cost of softwood logs.

6. Thailand

- Import Licensing & Permits:
 - Importers need permits from the Royal Forest Department (RFD), with strict approval conditions.
- Phytosanitary Regulations:
 - Thailand enforces strict pest control measures, including fumigation and quarantine for imported logs.
- Tariffs and Competition:
 - Import duties and competition from local timber can make softwood log imports less attractive.
- Preference for Processed Timber:
 - The Thai government promotes wood processing within Thailand, reducing demand for raw log imports.

Key takeaways & strategies for Exporting Softwood Logs

- Target markets with rising demand for softwood logs (e.g., India, Vietnam, and the Philippines).
- Ensure compliance with phytosanitary regulations (methyl bromide fumigation or heat treatment).
- Explore processed timber exports (e.g., veneer, plywood, engineered wood) to avoid raw log restrictions.
- Build strong local partnerships to navigate licensing and import requirements.
- Monitor policy changes, as some countries frequently adjust import rules to protect domestic industries.

Q. If New Zealand were to make the currently exported logs into products, domestically, for export to other countries. Which products should be targeted, to be sold to what countries?

A. The following is a list of products, potential target product export markets and the reasons behind the answer:

1. Engineered Wood Products (EWP)

- Products: Laminated Veneer Lumber (LVL), Glulam (Glued Laminated Timber), Cross-Laminated Timber (CLT)
- Target markets:
 - USA, Canada, and Europe: High demand for engineered wood in construction, particularly for sustainable and prefabricated buildings.
 - Japan and South Korea: Strong markets for structural timber products for residential and commercial construction.
 - Australia: A neighbouring market with demand for prefabricated wood components and construction materials.
- Why? Engineered wood products are lightweight, strong, and sustainable, making them ideal for global trends in green construction.

CLT and Southeast Asia

Several Southeast Asian countries could be potential markets for cross-laminated timber (CLT) and laminated veneer lumber (LVL) made from *Pinus radiata* in New Zealand. These engineered wood products are gaining popularity for their sustainability, strength, and versatility in construction. Potential markets and why they might be promising are:

A. Singapore

- Factors driving market opportunity:
 - Urbanisation and High-rise Construction: Singapore is focused on high-density urban development, and CLT and LVL are well-suited for modular and high-rise construction.
 - Sustainability Goals: Singapore has strong green building initiatives under its Green Building Masterplan, favouring sustainable materials like CLT.
 - Limited Domestic Timber: Singapore imports almost all its construction materials, making it reliant on high-quality imports.
 - Advanced Construction Industry: Singapore's construction sector is technologically advanced, making it open to adopting engineered wood solutions.

B. Malaysia

- Factors driving market opportunity:
 - Expanding Construction Industry: Malaysia's real estate and infrastructure sectors are growing, creating demand for innovative construction materials.
 - Sustainability Trends: Malaysia is increasingly focusing on green construction practices under its Green Building Index (GBI).

- Timber Familiarity: While Malaysia is a significant producer of tropical hardwood, engineered wood products like CLT and LVL may appeal as cost-effective, lightweight alternatives.

C. Vietnam

- Factors driving market opportunity:
 - Growing Economy and Construction: Vietnam is experiencing rapid urbanization and a construction boom, particularly in cities like Ho Chi Minh City and Hanoi.
 - Growing Export Hub: Vietnam is a significant wood product exporter, but demand for high-quality imports is rising for domestic and international projects.
 - Sustainability Concerns: Increasing awareness of environmental impacts may drive interest in engineered wood as an alternative to traditional hardwoods.

D. Thailand

- Factors driving market opportunity:
 - Tourism Infrastructure: Thailand's hospitality sector often requires high-quality construction materials for hotels and resorts, which could benefit from CLT and LVL.
 - Government Support for Green Building: Thailand is promoting energy-efficient and eco-friendly construction practices.
 - Demand for Prefabrication: CLT and LVL align with the growing interest in prefabricated building systems.

E. Indonesia

- Factors driving market opportunity:
 - Massive Population and Housing Needs: Indonesia's large population and urban growth require scalable housing solutions.
 - Infrastructure Development: The government's ambitious infrastructure projects may adopt CLT and LVL for certain applications.
 - Sustainability Shift: With deforestation concerns, there's growing interest in sustainable wood products for construction.

2. Plywood and Veneers

- Products: Structural and non-structural plywood, decorative veneers.
- Target markets:
 - China, Vietnam, and India: Growing demand for plywood in furniture and construction industries.
 - Middle East: Used for concrete formwork in construction.
 - USA and Europe: Demand for high-quality veneers and plywood for furniture and cabinetry.
- Why? These products can use smaller-diameter logs effectively and have diverse applications.

3. Wood Pellets and Biomass Fuels

- Products: Compressed wood pellets and biomass briquettes.

- Target markets:
 - Europe (Germany, Netherlands, UK): High demand for renewable energy sources due to carbon reduction goals.
 - Japan and South Korea: Growing adoption of biomass energy for power generation.
- Why? Wood pellets are a sustainable energy alternative, and New Zealand could leverage its forestry residues to produce them efficiently.

4. Paper and Pulp Products

- Products: Kraft pulp, cardboard, packaging materials, tissue, and specialty papers.
- Target markets:
 - China: Largest global importer of paper and pulp products for its manufacturing sector.
 - India and Southeast Asia: Growing markets for packaging materials due to e-commerce expansion.
 - USA and Europe: Demand for sustainable and recyclable packaging.
- Why? Capitalizing on sustainability trends, New Zealand could produce high-quality pulp for premium packaging materials.

5. Finger-Jointed Timber and Mouldings

- Products: Finger-jointed boards, skirting, architraves, and window/door frames.
- Target markets:
 - Australia: Strong market for pre-finished and ready-to-install timber products.
 - USA and Europe: Demand for high-quality mouldings for residential and commercial interiors.
 - Japan: High-quality finger-jointed timber is used in traditional and modern housing.
- Why? Smaller logs with knots can be processed into finger-jointed products, maximizing material use.

6. Prefabricated Wooden Components

- Products: Panels, frames, modular housing components.
- Target markets:
 - Japan and South Korea: Prefabricated building components are widely used in earthquake-resistant housing.
 - Australia: Increasing demand for modular and prefabricated housing solutions.
 - Europe: Strong push for sustainable and efficient construction methods.
- Why? Prefabrication aligns with trends toward faster, greener, and more efficient construction practices.

7. Furniture and Finished Goods

- Products: Indoor and outdoor furniture, cabinetry, and joinery products.
- Target markets:
 - USA and Europe: High demand for premium-quality furniture, especially eco-friendly and sustainably sourced products.
 - China and India: Demand for mass-market and affordable furniture.

- Middle East: Expanding hospitality and real estate sectors drive demand for furniture.
- Why? Furniture production allows New Zealand to capture higher value per log.