



MARLBOROUGH  
RESEARCH  
CENTRE  
Te Rito Hiranga o Wairau

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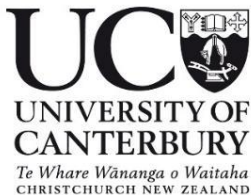
# MARLBOROUGH REGIONAL DURABLE EUCALYPT FORESTRY AND BIOMASS CASE STUDY

**MPI SLMACC PROJECT 406896**

**Workshop**  
**Marlborough Research Centre**

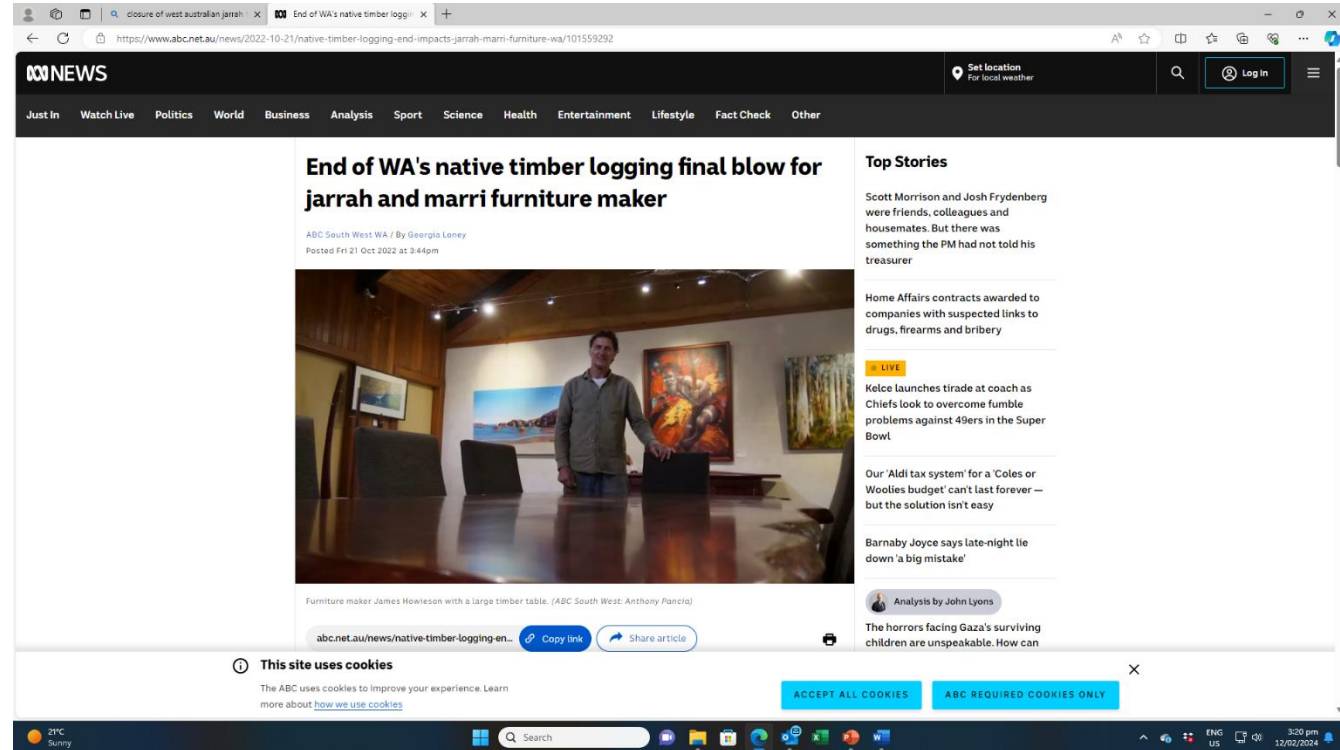
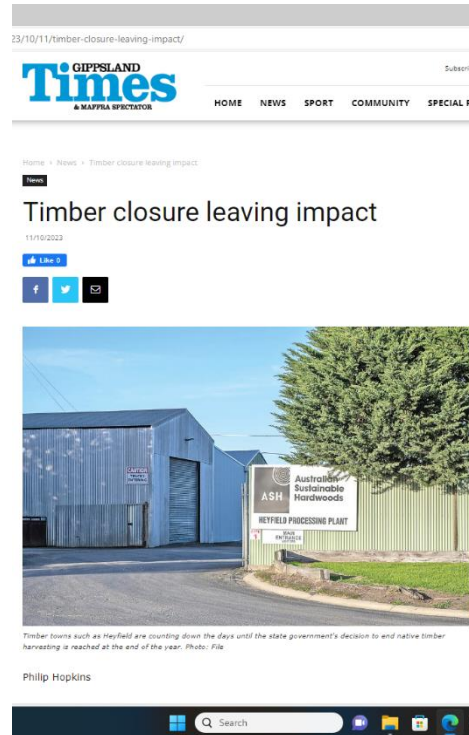
**Friday 16<sup>th</sup> February 2024**

**Paul Millen and Harriet Palmer**



# NZDFI's News Flash

## Emerging hardwood export market to Australia!



- Australian native forests supply hardwood timbers with total log sales worth A\$400 million per year.
- Environmental challenges ended logging in Victoria's state forests in 2023 and West Australia's jarrah forests will close in 2024.
- Australian eucalypt hardwood supply will reduce by around 40% i.e. A\$160 million.

# NZDFI's 2050 vision

## **The vision:**

New Zealand will be home to a multi-regional sustainable durable hardwood industry worth over \$1billion annually by 2050.

## **The vision for Marlborough:**

Marlborough will be home to a sustainable durable hardwood industry, based on 5,000 hectares of durable eucalypts planted between 2024-2050.

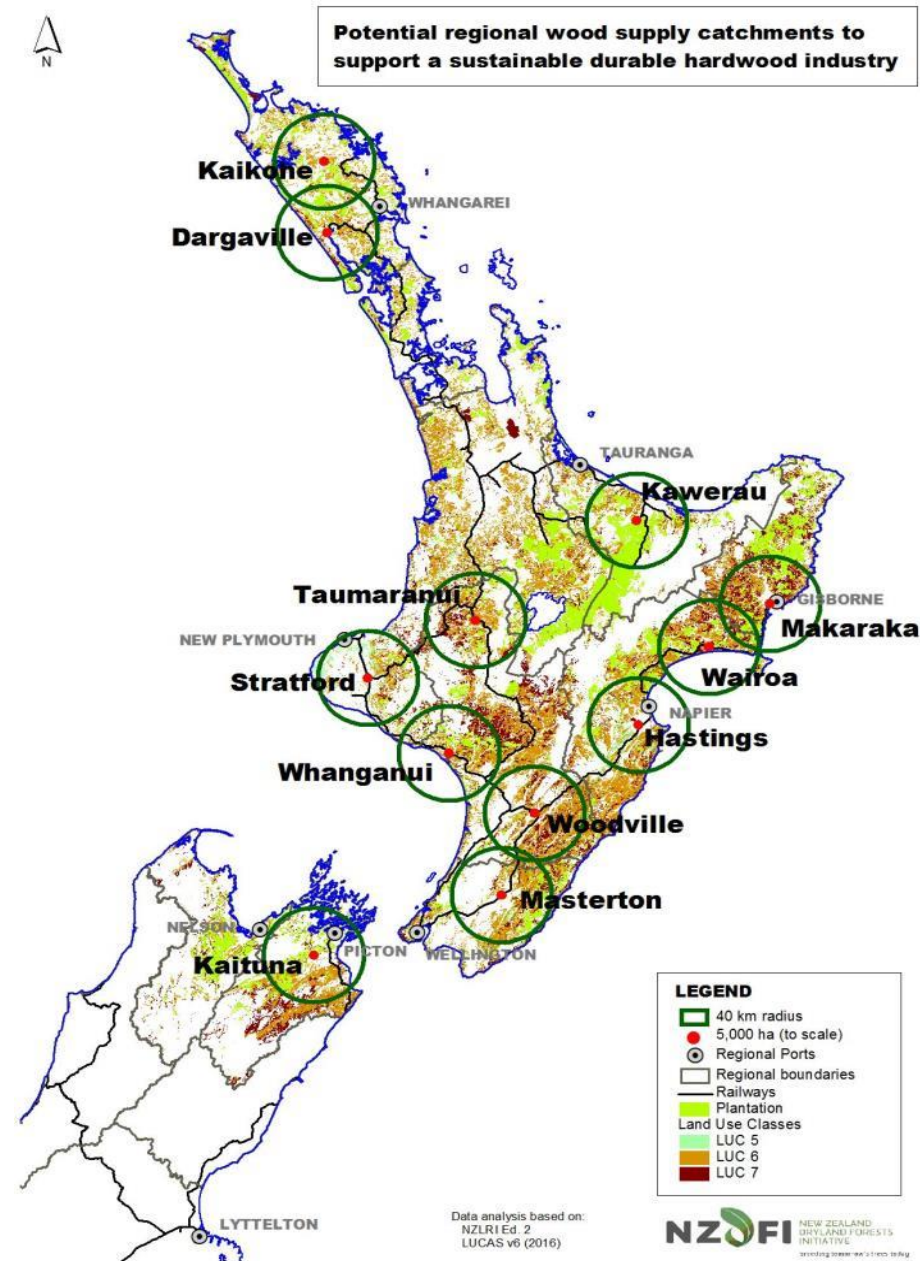
## NZDFI's goal:

12 wood supply catchments planted by 2050 in NZDFI target regions.

Wood-supply catchments centred on suitably zoned 5 ha industrial hub for future small-to-medium sized hardwood processing business.

Indicative catchment boundary – forests planted within 40km radius of the planned processing site.

Good road/rail/port connections for log supply and to transport hardwood products.



# NZDFI focus: establishing forests to supply high-grade naturally durable hardwood for a diversity of markets



**Posts, poles and crossarms**



**High quality timber**



**Cladding, structural & decking timber**



**Engineered wood products**



**Biomass**



# What is needed for Marlborough to achieve this?



**Develop a new supply chain by planting genetically improved durable eucalypt forests to produce a sustainable log and post supply!**



MRF Pukaka *E. globoidea* 19 years old (2022)

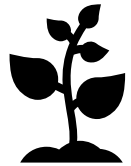


*E. regnans* export logs in Heagney's trucking yard, Renwick (2017)

# Developing a future durable hardwood supply chain in Marlborough

## Our case study plan:

- 5,000 ha wood supply catchment of durable eucalypt forests by:

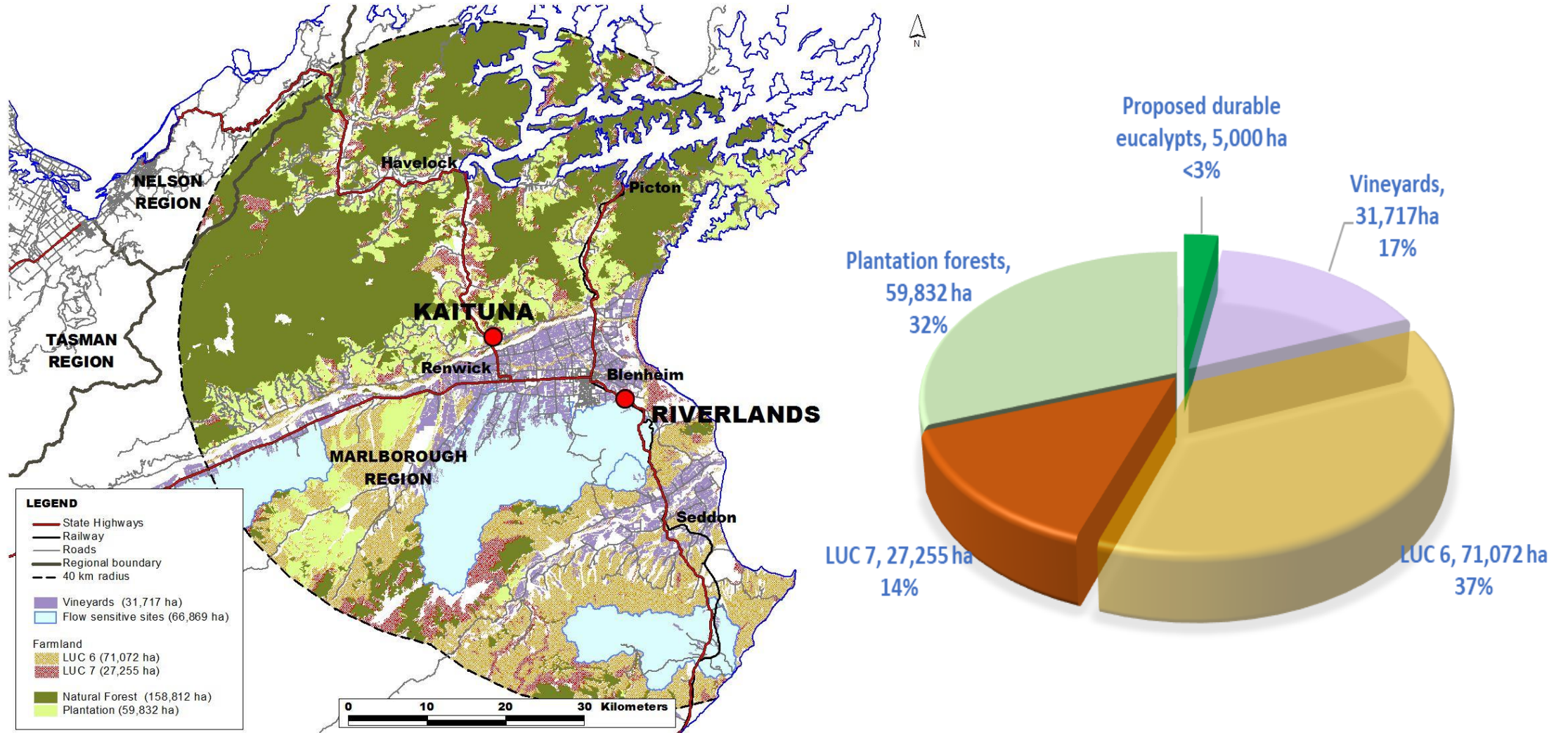


# Replanting 3,500ha of pine plantation cut-over in north Marlborough.

# Planting 1,500 ha in a mosaic of farm woodlots/small forests in south Marlborough.

- Two future processing hubs:  
a sawmill at Kaituna and a post/pole peeling plant at Riverlands.
- Primary outputs are posts and poles for vineyards, sawn timber and possibly veneer.
- Secondary outputs to include biomass products for heating/cooling; bio-products.

# Landuse analysis of 40km - 5,000ha wood supply catchment proposed for Kaituna and Riverlands hubs



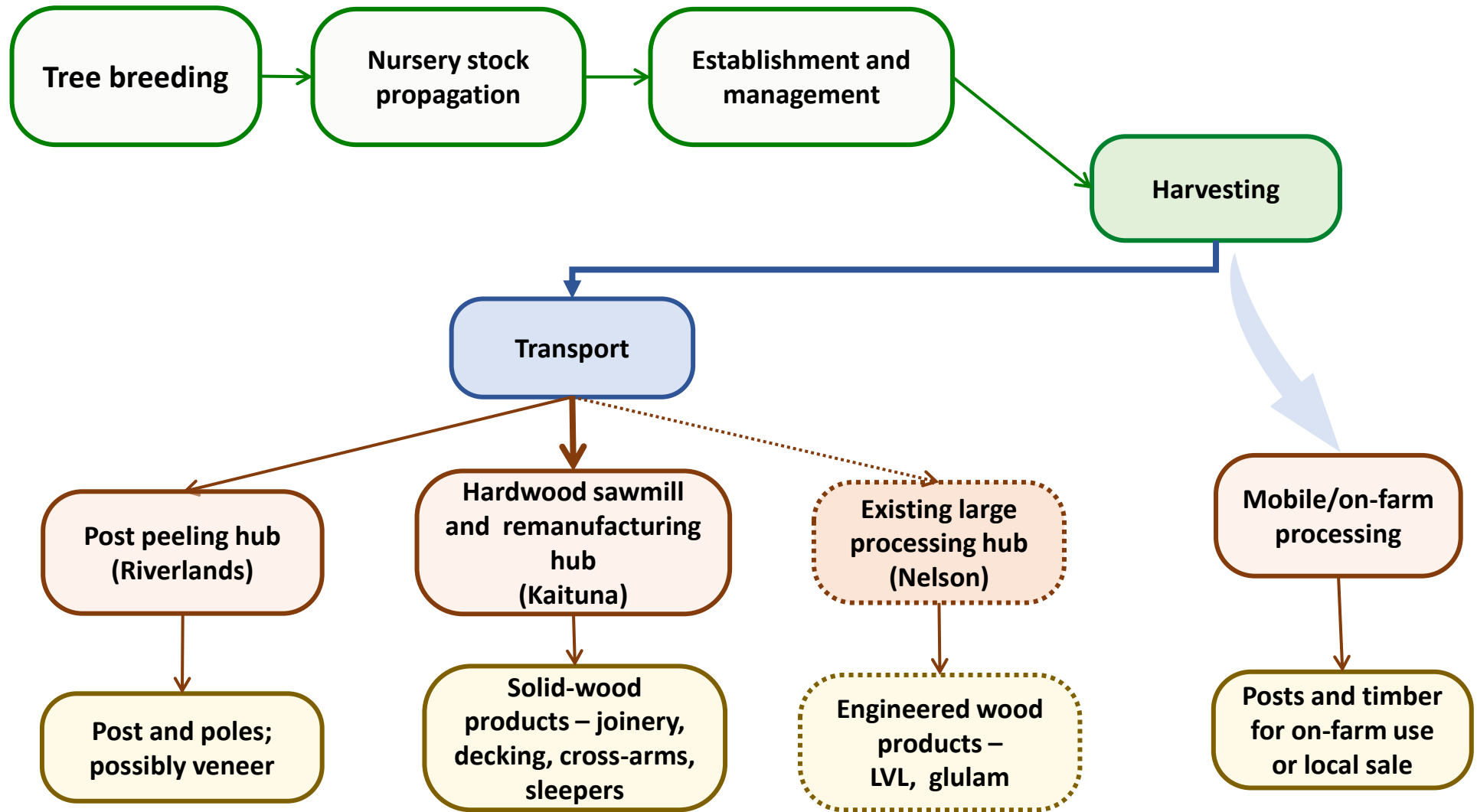


# What does this future supply chain involve?

Forestry supply chain

Logging and transport logistics

Wood processing and sales supply chain



**Domestic markets:** viticulture, horticulture, farming, timber merchants, big barns, builders/construction, joiners, furniture manufacturers, boat builders and DIY.

**Export markets:** timber merchants and traders (rather than log traders!)

# Saw mill and remanufacturing plant 'hub' concept: supplied with hardwood logs grown within a 40km catchment

Return on capital employed\* ~25%

\* Integrated sawmill and remanufacturing operation –  
2020 capital set up cost of \$27 million.

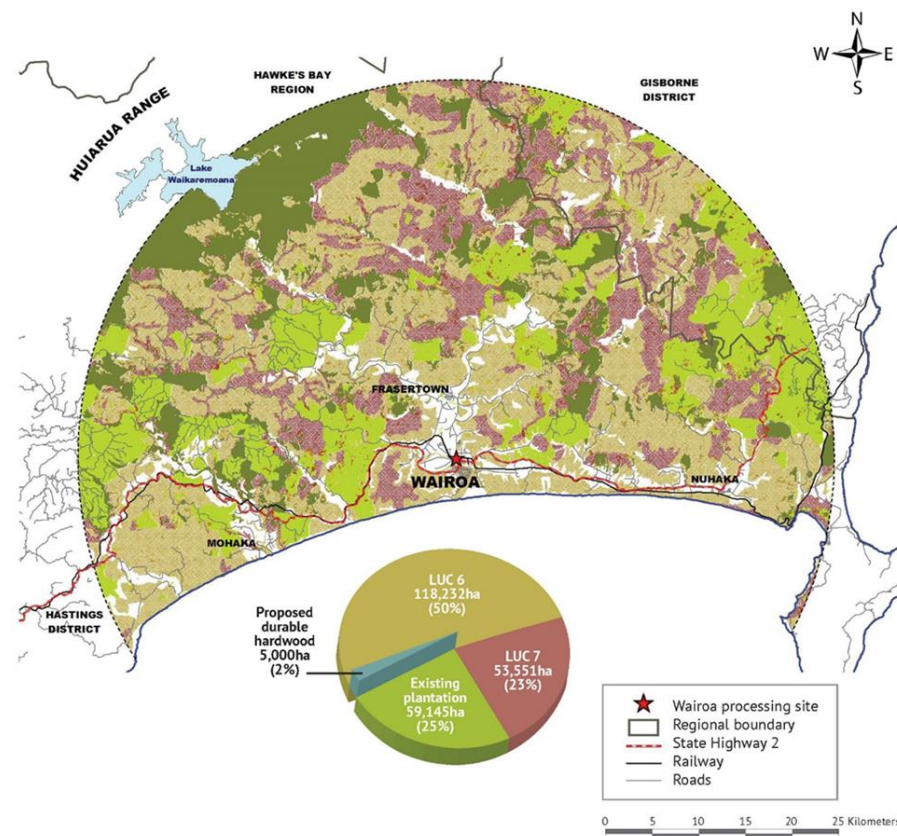
Direct employment created (FTEs):

Forest establishment:	3-10
Forest harvesting:	9-10
Sawmilling:	50-55
Remanufacturing	130-135

Additional employment in log transport and other  
service & downstream sectors.

**Annual estimate of regional GDP from 2051:**  
**\$82.5 million**

(based on 2020 costs and revenues)



*'Assessment of afforestation and future wood processing opportunity with non-radiata species: Wairoa District'* (Peter Hall, Scion, April 2020). Report produced for Hawke's Bay Regional Council/HBRIC.

# Kaituna proposed sawmill and remanufacturing hub on 5 hectare site

## Product supply

- Hardwood timbers
- Posts and poles
- Possibly veneer
- Wood fuel products – chip; possibly pellets

*'Assessment of afforestation and future wood processing opportunity with non-radiata species: Wairoa District'* (Peter Hall, Scion, April 2020). Report produced for Hawke's Bay Regional Council/HBRIC.

Small mill & processing hardwoods (eucalypts) – 5 hectare site	
Logs in: m <sup>3</sup> per annum	52,000
Lumber out: m <sup>3</sup> p.a	30,000
Low value products out m <sup>3</sup> p.a	6,000
Residuals out: m <sup>3</sup> p.a	13,000
Remanufacturing – in: m <sup>3</sup> p.a	24,000
High value products out: m <sup>3</sup> p.a	21,600
Log price delivered in \$/m <sup>3</sup>	\$195
High value product price \$/m <sup>3</sup>	\$1,950

# Australian hardwood sawmill visit 2009 – Boral's at Narooma, NSW then processing 18,000 cubic metres of logs annually



survey pegs



Mixed native log supply of durable eucalypts - ironbarks, stringybarks and spotted gum.

A range of products were sawn including



beams



cross arms



decking/flooring

## Kaituna hub: plantation forest area required for sustainable supply

- Based on 30-year rotation for north Marlborough.
- Assume total recoverable volume average 500m<sup>3</sup>/ ha.
- Require harvest of around 100–110 ha/year to generate 52,000 m<sup>3</sup> log supply for the mill.
- Forest area required approx. 3,000–3,500 ha.



# Riverlands proposed post/pole peeling hub on 1-2 ha site

## **Product supply**

- Posts and poles
- Wood fuel products – chip; pellets
- Possibly veneer and/or bio-products

Target annual production – 500,000 posts (50% of current annual demand)

Assume 45 posts per cubic metre = approx. 11,000 m<sup>3</sup>

Sustainable log supply required = 15,000 m<sup>3</sup> (based on 75% conversion)

Residue production (chip or veneer) = 4,000 m<sup>3</sup>

## Riverlands hub: forest area required for sustainable supply

- Based on 20-year rotation, low productivity dry South Marlborough sites.
- 600 stems per hectare grown to 20 or 30 cm DBH.
- Assume total recoverable volume 150 - 200 m<sup>3</sup>/ha.
- Require harvest of around 75 - 100 ha/year to deliver 15,000m<sup>3</sup>/yr to mill.
- Forest area required approx. 1,500-2,000 ha matched with ground based harvesting systems.



Small scale option could be post peeler operating on site.

Super Forests Plantations – Lismore NSW (*Lausberg, 2019*)

- Spindle-less debarking lathe producing 250 posts per day from already debarked logs could produce 62,500 posts per year.
- Log length up to 2.5m; diameter range 80 – 400 mm.
- Capital set up cost \$300K



- **Small-scale, local businesses could have low supply chain emissions.**
- **More research needed on short rotation forestry options – silviculture, harvesting technology and economics.**



## What is the annual size and value of Marlborough's vineyard post market?

- Based on estimates, assume around **1,000,000 posts/yr.**
- This is **22,200 m<sup>3</sup>** of posts/yr.
- Retail value \$700 - 800/m<sup>3</sup> = around **\$15 - 18 million annual value.**
- Proposed Riverlands hub could produce approx. **500,000 posts/yr.**
- Kaituna hub and small-scale operators could produce more posts.

# Biomass for bio-fuel could be recovered along the supply chain



(Brian Cox, Executive Officer)

Whole tree harvest – TBC  
Sawmilling offcuts – 13,000m<sup>3</sup>  
Remanufacturing residues – 3,000m<sup>3</sup>  
Post peeling residues – 4,000m<sup>3</sup>

could produce

Biomass for biofuel  
various types/sizes

Biomass recycled  
for wood  
processing energy

A circular orange arrow icon indicating a recycling or feedback loop.

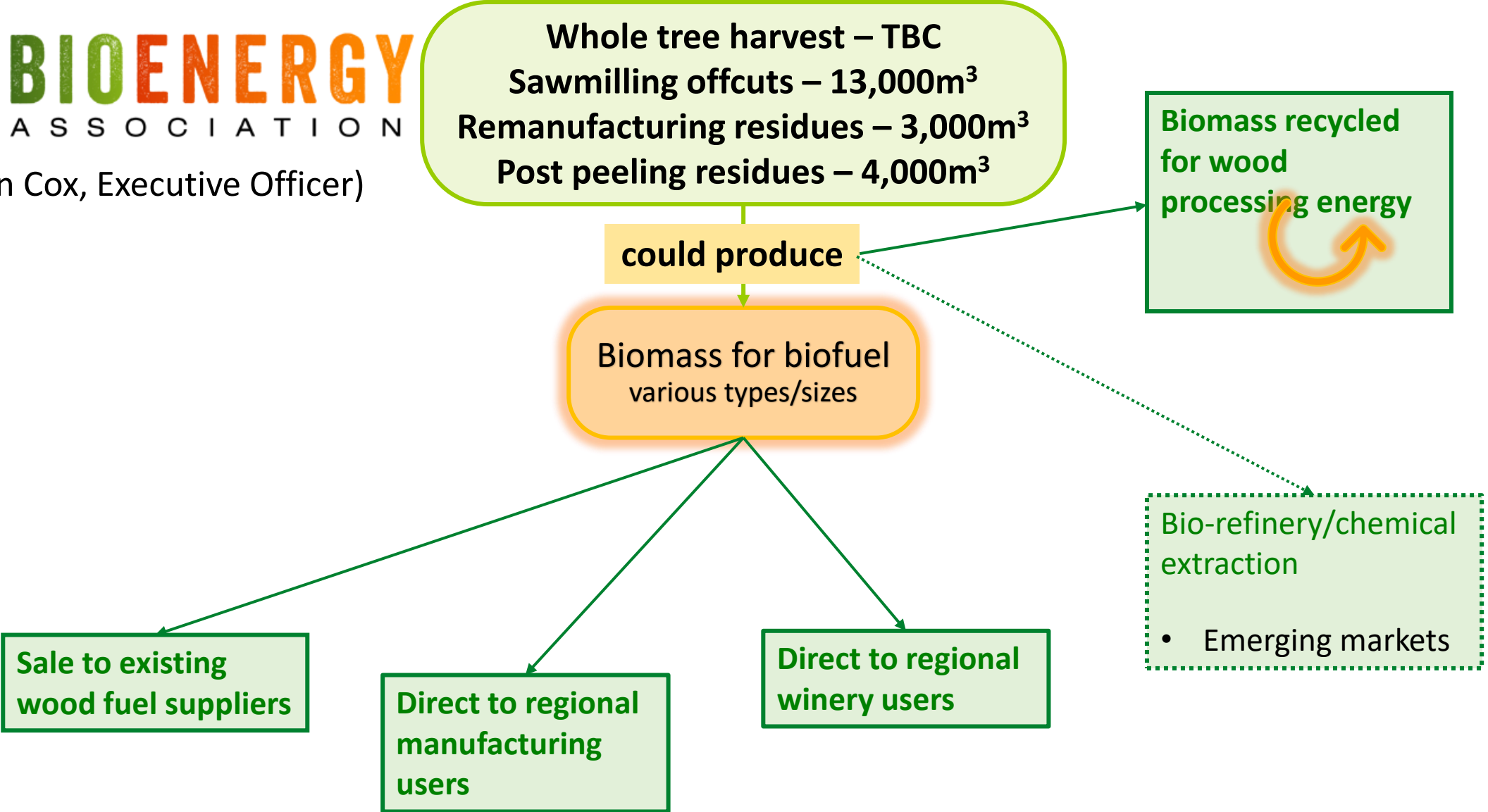
Bio-refinery/chemical  
extraction

- Emerging markets

Sale to existing  
wood fuel suppliers

Direct to regional  
manufacturing  
users

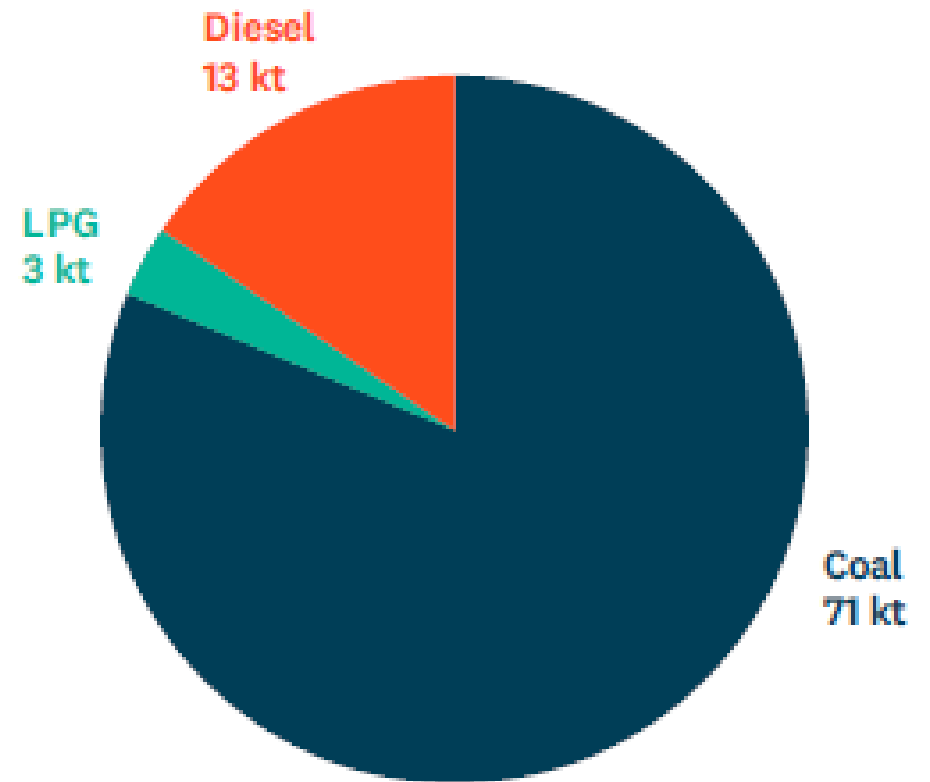
Direct to regional  
winery users



# Regional Energy Transition Accelerator (RETA)

## Nelson, Marlborough, Tasman – Phase One Report (November 2023)

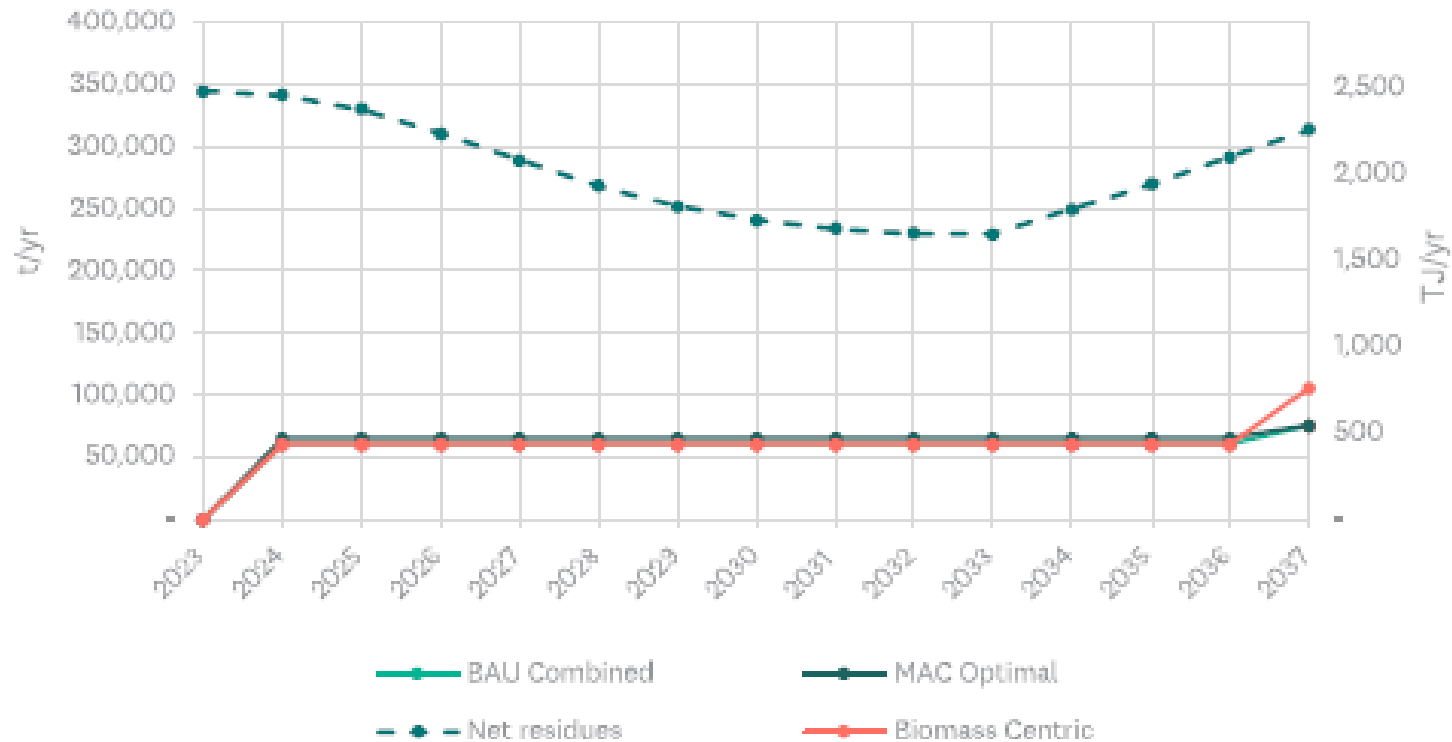
- Covers the Nelson City, Marlborough, and Tasman districts i.e. Top of the South.
- Identifies sites that either have fossil-fuelled process heat equipment larger than 500kW (based on process heat equipment reported in the Regional Heat Demand Database)
- ...or sites that EECA has detailed information about de-carbonisation pathway.



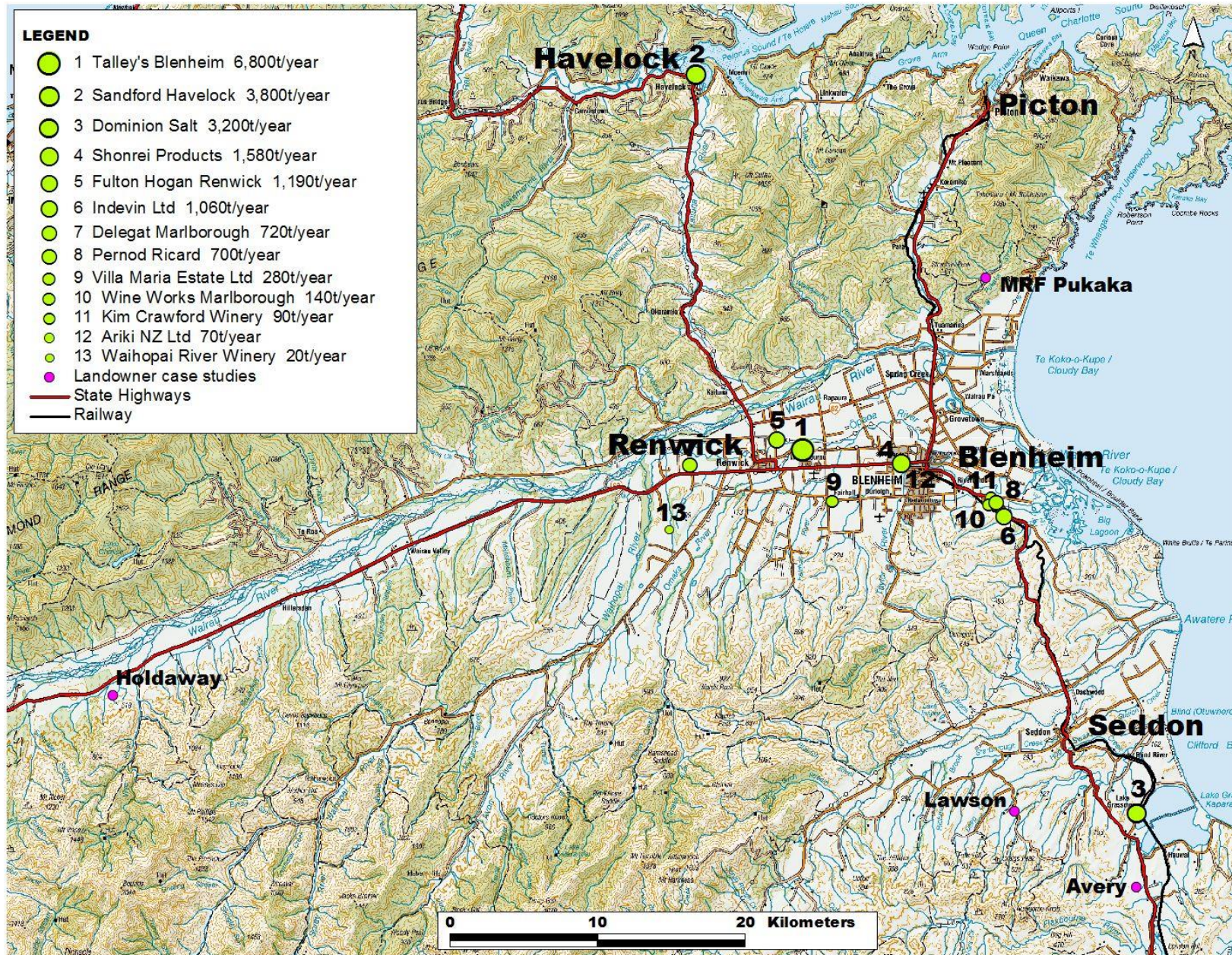
Total 2020 annual emissions by process heat fuel in NMT districts - RETA (2023)

# Nelson, Marlborough & Tasman potential forestry biomass/residue available - green tonnes

- NMT region plantation forest area 166,070 ha; 156,792 ha radiata pine and 6381 ha Douglas fir (Data 1 April 2021). Source: Ahikā, Margules Groome, RETA - 2023.
- *‘a plausible view of the medium-term availability of NMT biomass for process heat purposes.’*



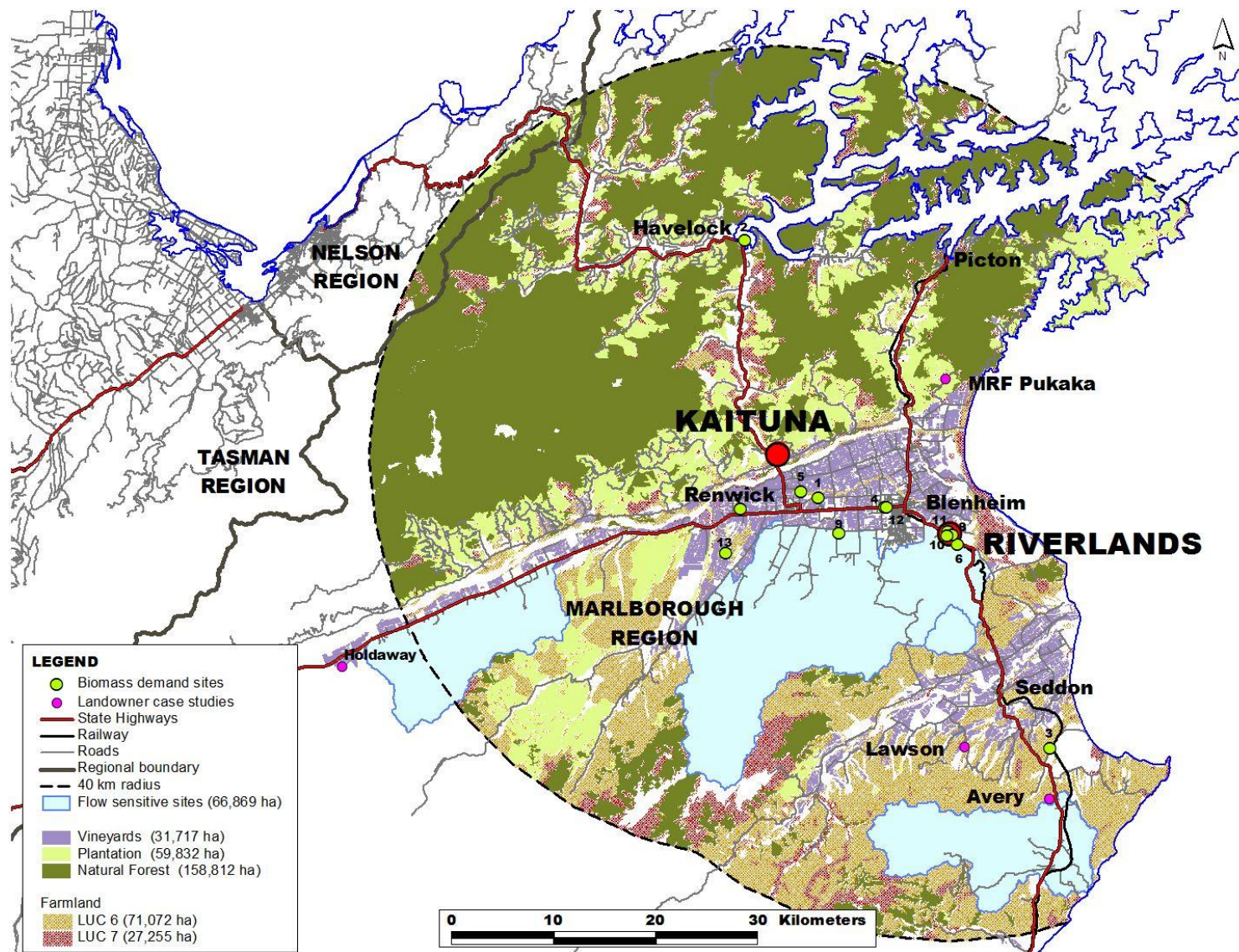
# Marlborough region RETA sites with fuel switching requirements



# Landowners case study outcomes – emissions profiles

Landowner & property type	Emissions calculation	Annual carbon emissions tCO <sub>2</sub> e	Case study objective
<b>Lawson – 80ha</b> <b>Small stock dryland farming operation</b>	MfE stock farming on-line calculator	-179 -2.24 per ha	Post and biomass regime to reduce net livestock emissions
<b>Avery – 2550ha</b> <b>Large stock farming operation that includes substantial on farm stock feed production</b>	MfE stock farming on-line calculator and fuel converter	- 4,315 -1.69 per ha	Post, sawlog and biomass regime plus carbon sequestration to reduce net livestock and operations emissions
<b>Holdaway – 155ha</b> <b>Vineyard and small winery operation</b>	Vineyard and winery industry averages	- 199 (Vineyard) -1.28 per ha 18.7 (Winery)	Post, sawlog and biomass regime on forestry property plus carbon sequestration to reduce net operations emissions
<b>Marlborough Regional Forests Pukaka Forest - 97.5ha</b>	Data published by the University of Canterbury School of Forestry (McClean et al 2023).	- 38 -0.39 per ha	Sawlog and biomass regime NOTE: pre 1990 forest therefore excluded from ETS

# The goal for Marlborough: two processing hubs sustainably producing over \$100 million of durable hardwood products from 5,000ha



# NZDFI website – an extensive resource for growers, processors, researchers and for education

Home - NZ Dryland Forests Inn... x +


nzdfi.org.nz

Files - Dropbox HandbookArticleLis... In The Hills 2016-08... New Zealand Plants... Forestry-Managem... Planting trees on fa... ETS Home Page





## NZDFI NEW ZEALAND DRYLAND FORESTS INNOVATION

Breeding durable hardwood | Whakatipu taikākā mauroa

[Home](#) [About NZDFI](#) [Our Science](#) [Research](#) [Trial sites](#) [For Growers](#) [Resources](#) [Contact](#)



The NZ Dryland Forests Innovation (NZDFI) is a collaborative research and development programme. Our vision is to develop a sustainable multi-regional hardwood industry based on planting genetically improved durable eucalypt forests from 2020 to 2050.

-  OUR VISION
-  GROWER INFORMATION
-  PROJECT UPDATES
-  SEEDLING SALES



# XyloGene.com website for seedling sales

XyloGene  
Durable Eucalypts by NZDFIP Ltd

Home Seedling Sales Contact Us

Plant high quality XyloGene eucalypt seedlings to grow high quality durable hardwood.

The future is **durable**

Contact Us

Seedling Sales

# Thanks to an excellent team of dedicated people

- Shaf van Ballekom, Chairman NZDFI (Proseed NZ Ltd, Amberley)
- Gerald Hope, Deputy Chair (CEO Marlborough Research Centre Trust, Blenheim)
- Susan Foster, Office Manager (Marlborough Research Centre Trust, Blenheim)
- Professor Bruce Manley, HoD (School of Forestry, UoC)
- Assoc Professor Clemens Altaner, Wood science (School of Forestry, UoC)
- Assoc Professor Luis Apiolaza, Tree Genetics (School of Forestry, UoC)
- Professor Euan Mason, Physiology & modelling (School of Forestry, UoC)
- Assoc Professor Steve Pawson, Forest entomology (School of Forestry, UoC)
- Assoc Professor Justin Morgenroth, Forest GIS systems (School of Forestry, UoC)
- Dr. Vega Xu, Forest Geospatial Technologies (School of Forestry, UoC)
- Dr. Monika Sharma, Katmandoo database (School of Forestry, UoC)
- Ruth McConnochie, Consultant tree breeder (under contract to NZDFI)
- Harriet Palmer, Communications consultant (under contract to NZDFI)
- Roger May, Forestry GIS mapping specialist (under contract to NZDFI)
- Ash Millen, Forestry technician (under contract to NZDFI)
- Kevan Buck, Administration (MRC Trust, Blenheim)
- Other UC staff and 8 PhD students
- NZDFI trial host landowners