

Carbon Forestry

Opportunities and Risks for the Farming Sector



Permanent Forests
NZ Limited

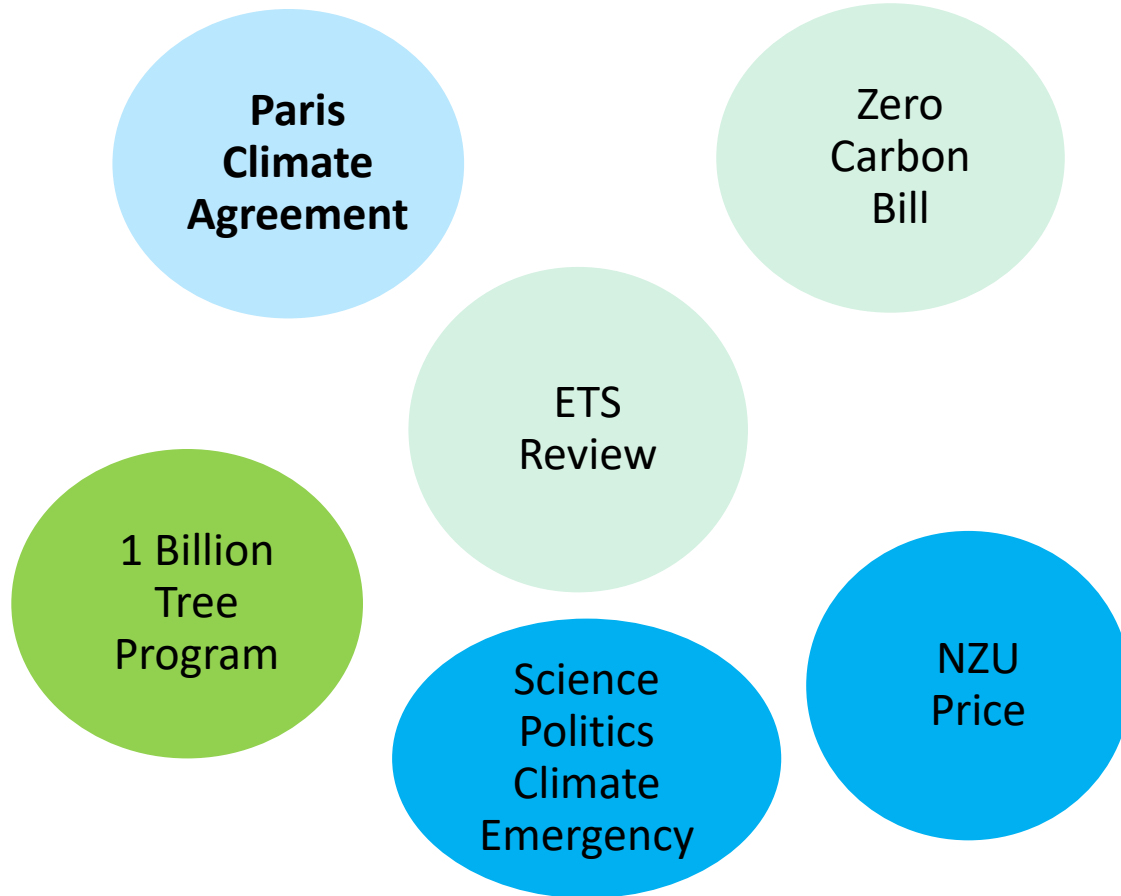
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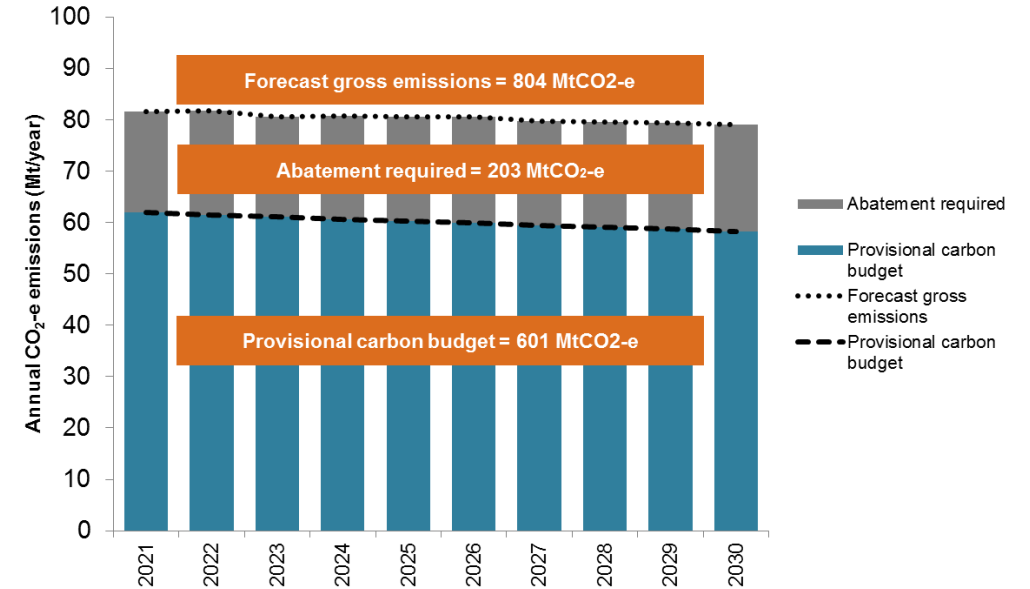
Carbon Forest Services

www.carbonforestservices.co.nz

Why is the opportunity now?



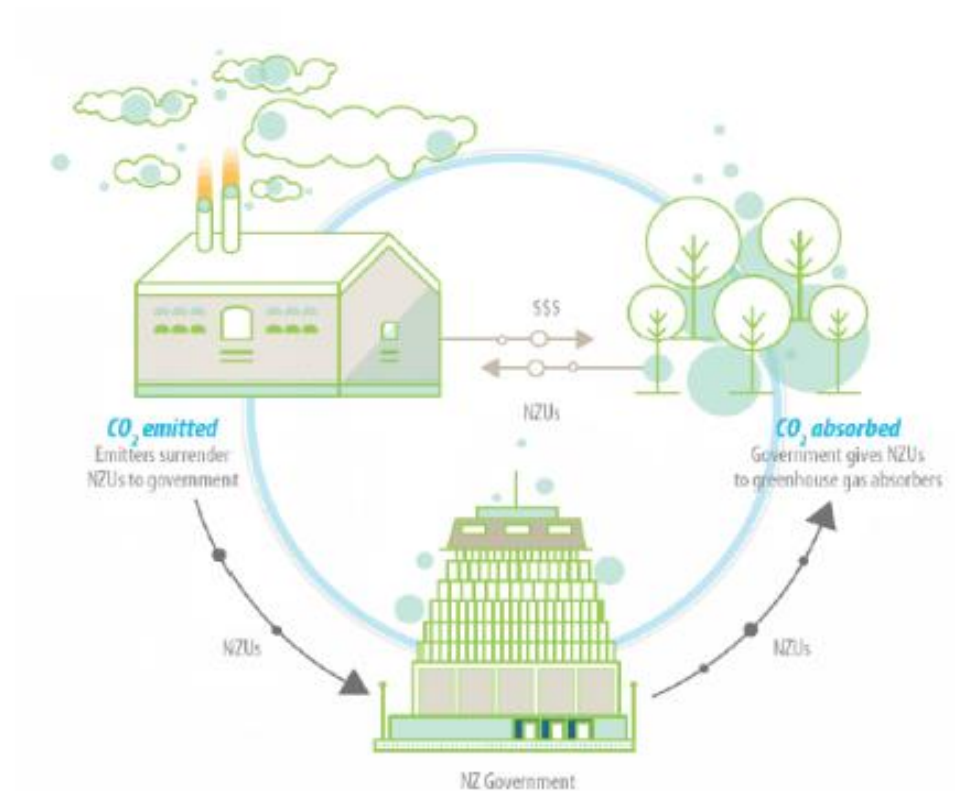
The NZ ETS and New Zealand's provisional carbon budget for 2021-2030 (Source MFE)



Source: Ministry for the Environment

What is the emissions trading scheme (ETS) ?

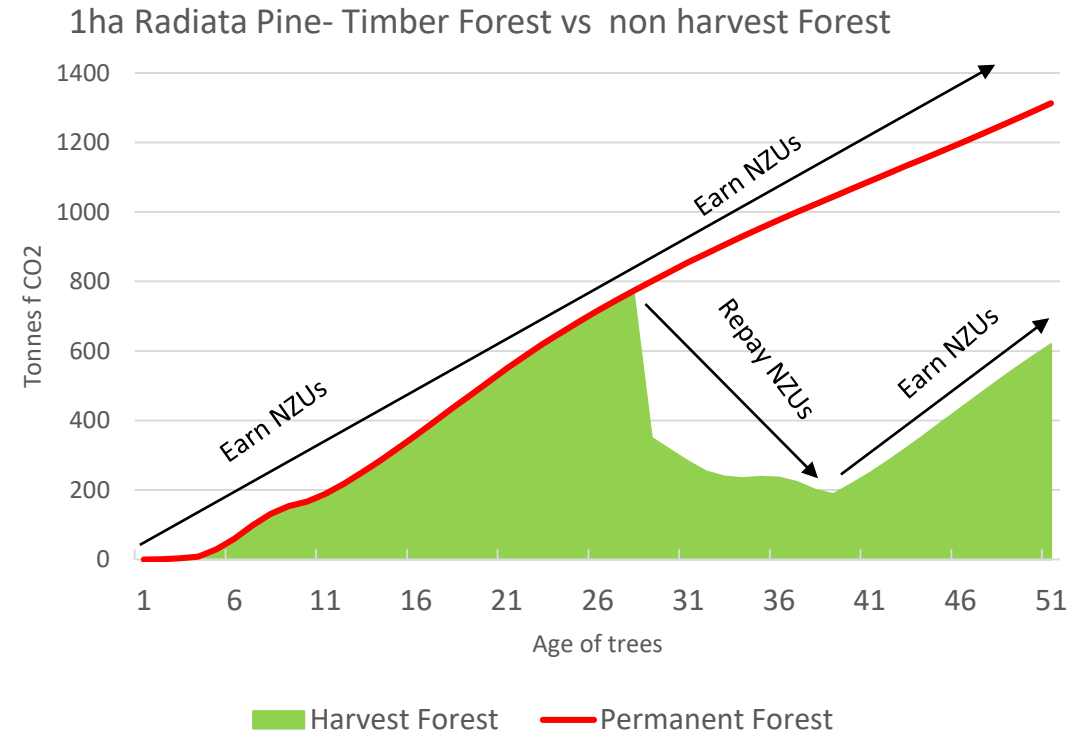
- The ETS is the pricing and trade of carbon units- called NZUs- to reduce greenhouse gas emissions
- 1 NZU represents a tonne of carbon dioxide equivalent
- Emitters have to surrender NZUs to Government each year to cover their emissions
- Those who remove greenhouse gases (e.g. forest owners) can earn NZUs to sell



Source: Environmental Protection Agency

How do forests earn NZUs?

- Trees absorb carbon dioxide from the atmosphere and store it in their trunks, branches, and roots.
- The amount of carbon stored in a forest depends on species, stocking, site quality (esp. rainfall) , and how long the forest is left to grow.
- When trees are harvested or die, carbon is released back into the atmosphere.



Source: Ministry for the Environment- Forestry in the Emissions Trading Scheme

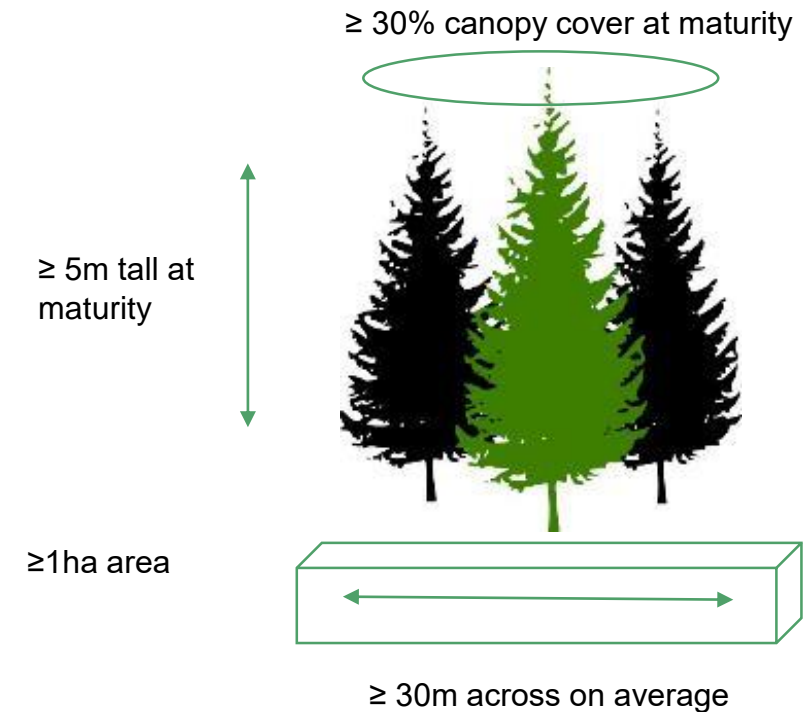
Source: P. radiata- Auckland- MPI look up tables (Climate Change (Forest Sector) Regulations 2008)

What is an eligible carbon forest?

Forests established on 'bare land' after 1989 = eligible post-1989 forest

Eligible forest =

- At least 1 hectare in area
- At least 30m in width (excludes most shelterbelt plantings)
- 30% canopy cover per hectare at maturity
- Tree species capable of reaching 5 metres in height at maturity in situ (i.e. in location they are growing)

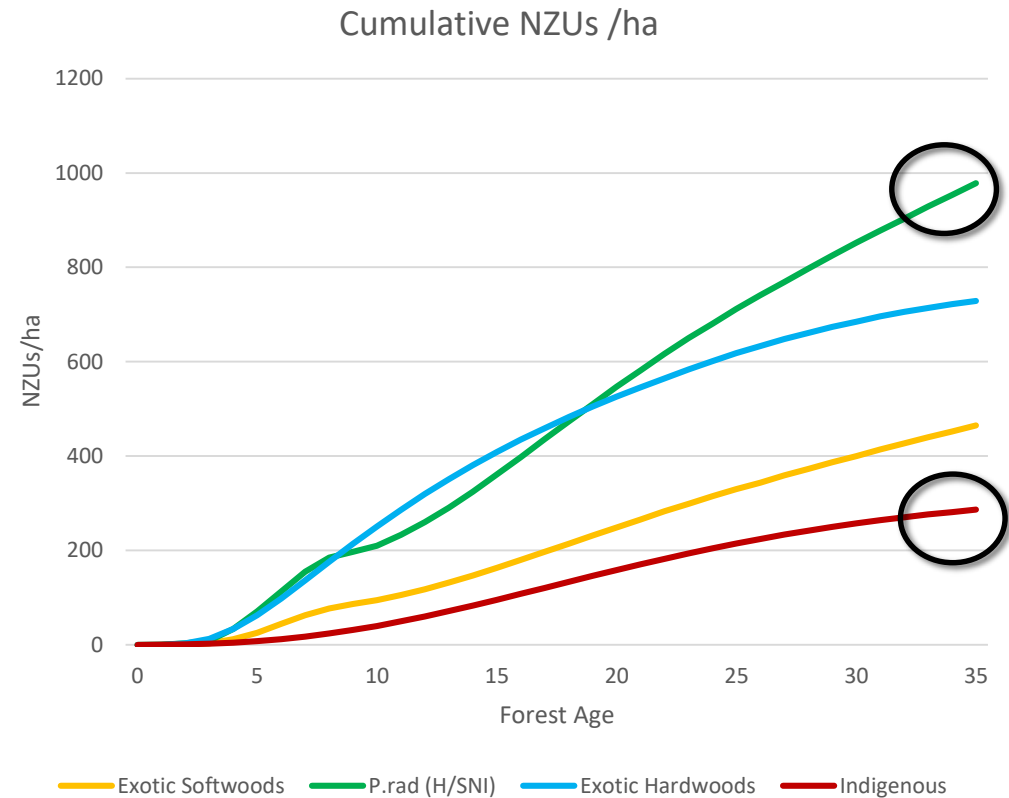


Source: Ministry for Primary Industries

Species comparison/Sequestration rates

- High variability between species based on growth rates
- Exotics fast / natives slow
- Exotics cheap / natives costly
- Early sequestration maximizes Internal Rate of Return (IRR%)

Cost of creating an NZU,
Exotics \$10-\$30,
Natives \$20-\$300



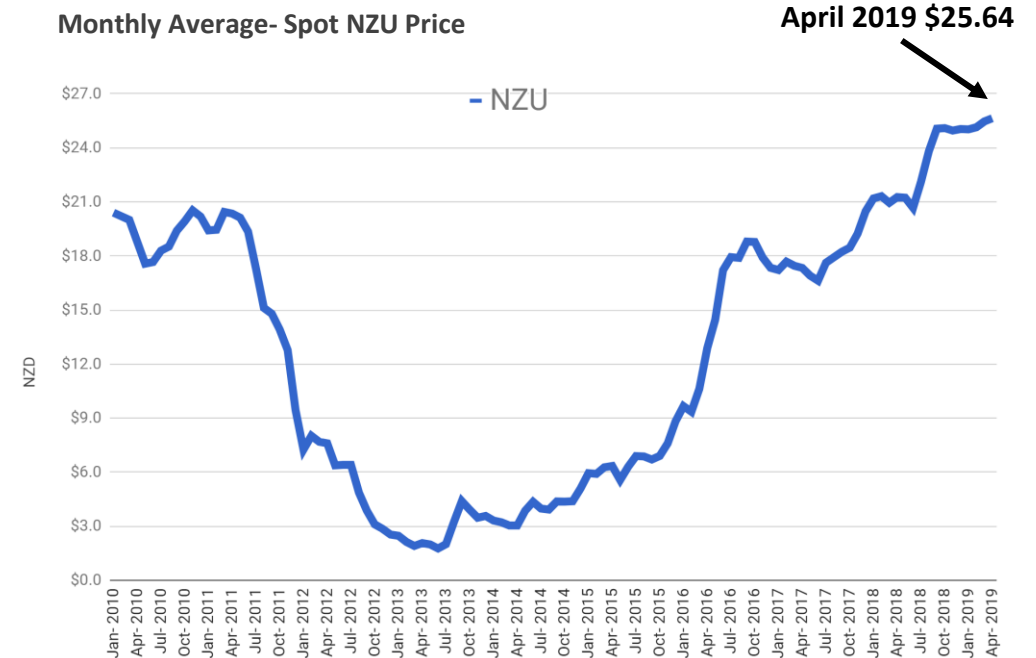
Source: MPI look up tables (Climate Change (Forest Sector) Regulations 2008)

Why is NZU price on the move up?

- NZ is committed to 'Net Zero by 2050' : pricing carbon is NZ's main strategy
- NZ's commitment will be hard to achieve, carbon price has to go up to effect change
- NZU demand doubles in 2019 due to phase out of emitter 2-for-1 subsidy

**By 2020 NZ ETS= 40 Million NZU
(\$1B industry per annum)**

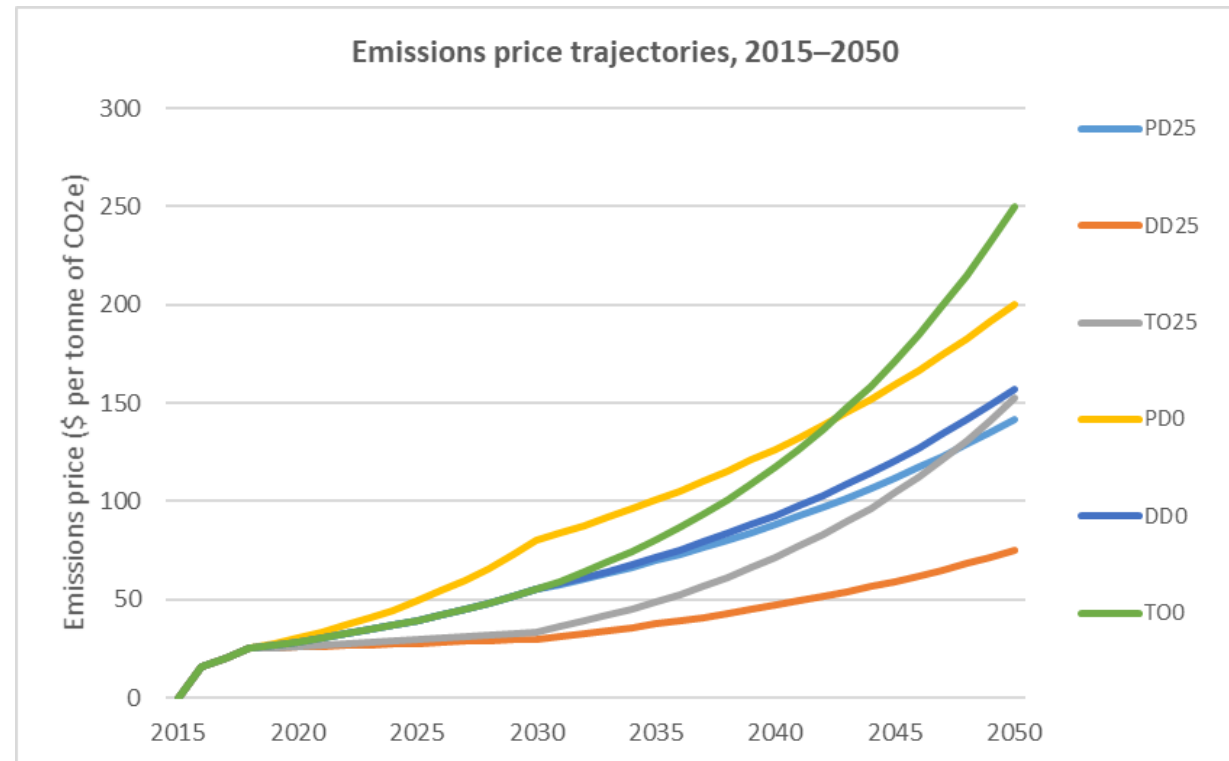
- NZETS \$25/NZU price cap to be lifted in 2020 and a floor price implemented (EU ETS Price is NZ\$44)
- Uncertainty as to supply of NZUs during 2021 to 2030



Source: Carbon Forest Services

Future NZU price?

- What ETS carbon price will be required to achieve Net Zero by 2050? (\$25/NZU = 7 cents/litre of fuel, 3% of fuel price)
- Productivity Commission models \$75 - \$250/NZU by 2050
- NZ's land use sector is key to achieving Paris target
- Commission recommends agriculture be brought into the ETS
- Large scale afforestation required to reduce NZ's net emissions, e.g. > 1.3 million ha of marginal land)



Source: New Zealand Productivity Commission. (2018). *Low-emissions economy: Final report.*

Carbon schemes- PFSI forest and ETS forest

- Permanent Forest Sink Initiative (PFSI) = long term protection > environmental integrity



- PFSI Units = gold standard



- But... restricts clear-fell harvesting and land use change



PFSI	ETS- Post-1989
Participant- Landowner	Participant- Landowner, or Forestry Right Holder, or Lease Holder
Similar costs	Similar costs
Rules- Legislation & Covenant	Rules- Legislation
Covenant registered on Land Title	Notice registered on Land Title
Minimum Term of 50 years	No minimum term. Can exit anytime
Restricted- Small coup harvesting	No harvest restriction- Can clear fell
Permanence of forest	No guaranteed permanence of forest
~15,000 ha registered (~10,000 ha indigenous)	~325,000 ha registered (~30,000 ha indigenous)

1 Billion Tree Funding Support-

- \$240M earmarked for 1BT, (\$160M for natives, \$80M for exotics)
- Different 1BT rates for different outcomes / species
 - 30% paid payment before establishment
 - 50% paid after establishment
 - 20% paid once forest maintained
- Landowner keeps carbon- (except for radiata where Govt keeps first 6 years of carbon)
- Top ups available for erosion prone land/ fencing
- Max 300ha per annum per application

‘right tree in right place’

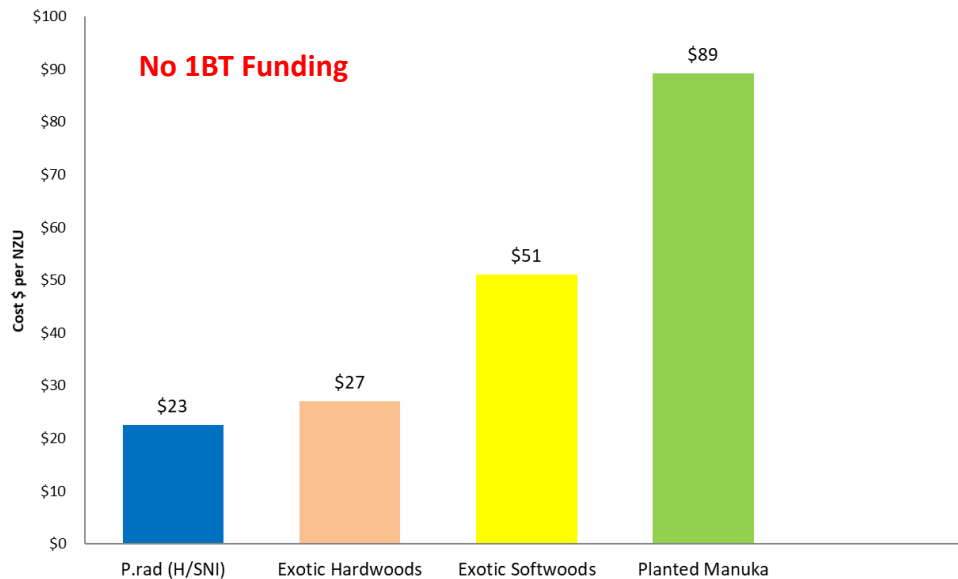
Type of planting	Size	Base rate/ha
Indigenous mix (e.g. a mix of native trees and shrubs)	1ha–300ha	\$4000
Mānuka/kānuka (particularly for erosion control or as a nurse crop for an indigenous forest)	5ha–300ha	\$1800
Indigenous natural regeneration (e.g. retiring land and managing it to naturally return back to trees)	5ha–300ha	\$1000
Exotic (e.g. planting eucalypts, redwoods or <i>Pinus radiata</i>)	5ha–300ha	\$1500

Cost of Sequestering Carbon -

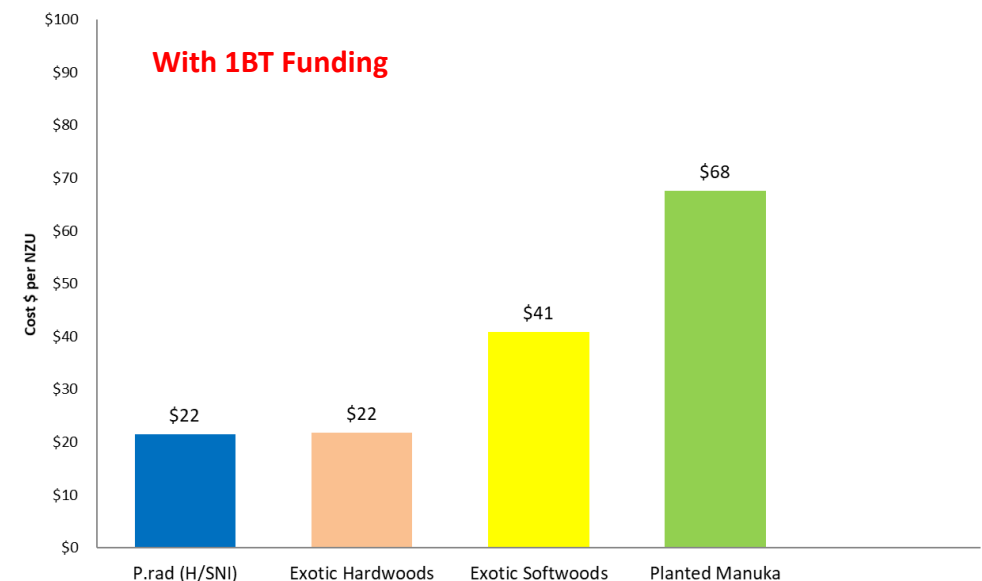
How much does it cost to create 1 carbon Unit (NZU) with different species

Formula: $(NPV \text{ Costs} / NPV \text{ CO}_2) = \text{Cost of 1 NZU NPV (Net Present Value)}$

Cost of creating 1 NZU at 8% Discount Rate
(\$4000/ha land value)



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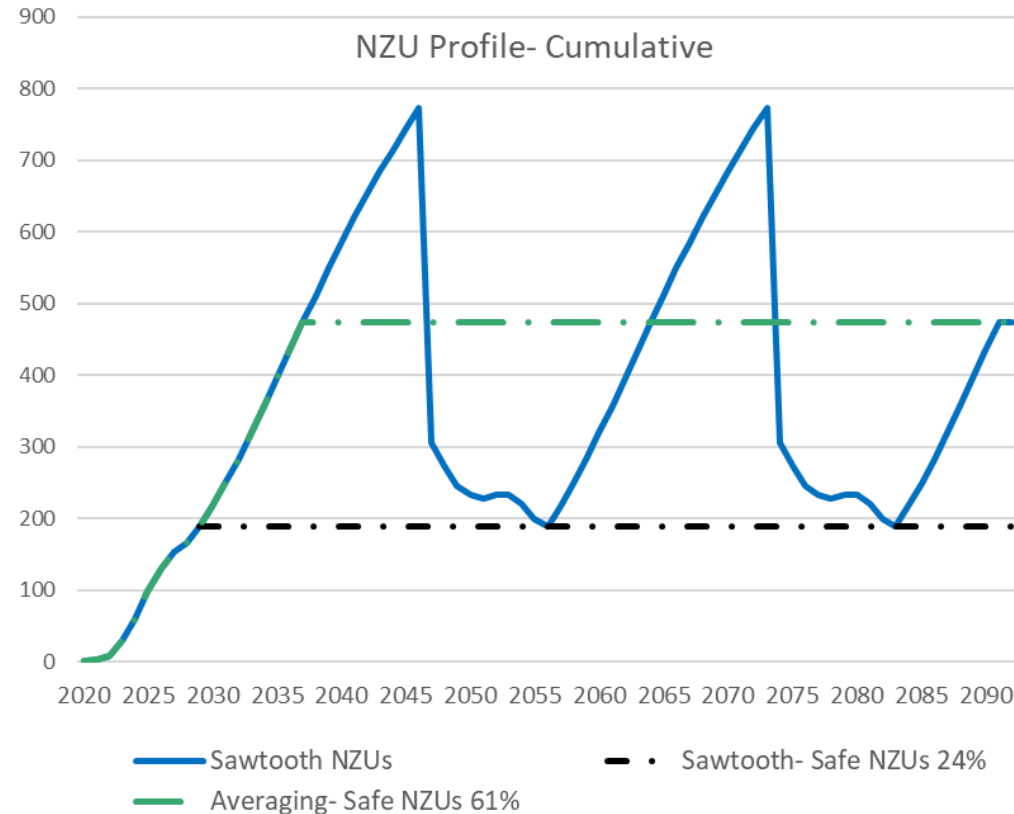


Carbon Loss Risk- Barrier to Participation

- Current rules: surrender NZUs for decrease in carbon stocks
- Carbon loss events mainly harvesting, or possibly from fire ,or windthrow, or disease
- Liability capped at number of units issued
- Some carbon does not need repaying if forest replanted (approx 25% = safe carbon)
- Carbon loss insurance available, but V expensive

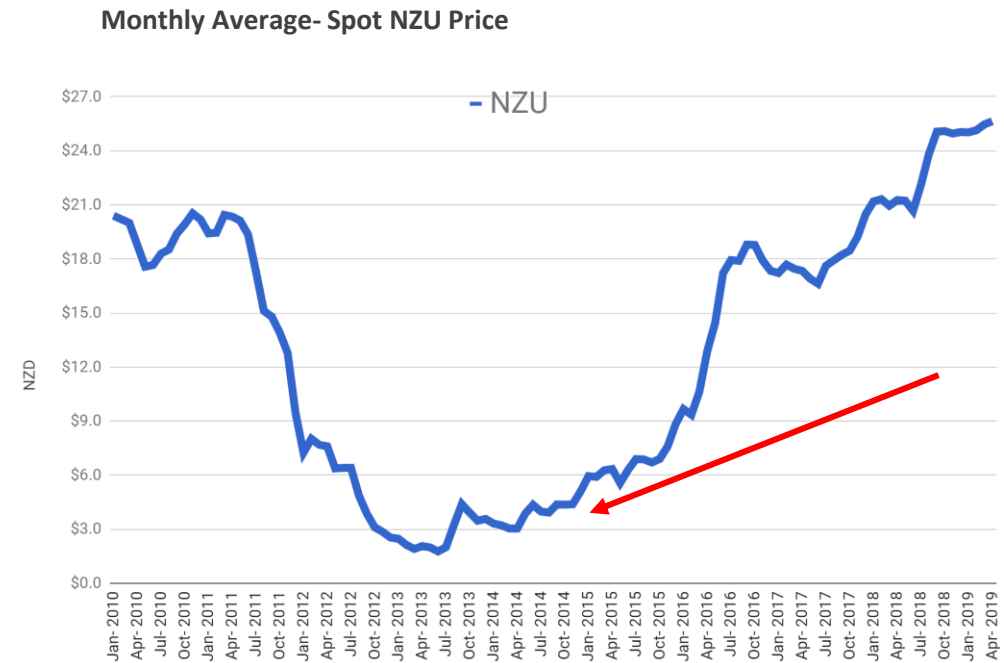
NEW ETS RULES REMOVE REPAYMENT RISK

- Timber forests-Averaging of carbon, no repayment at harvest if replanted (or with adverse events losses)
- Permanent forests-Full assignment of carbon, no repayment with adverse events losses if forest re-established and maintained



Carbon Price Risk-

- NZETS market is created solely by regulation
- To date has been volatile with major crash
- Appears price will be high into the future but **impossible** to be certain
- Uncertainties include: Auctioning? / International Units? / Global Recessions? / Future Governments? / Rule changes? / Technology / Politics / Wars / Pandemics
- Can hedge & spread risks by
 - Funding assistance e.g. 1BT Grants, or JV partners
 - Carbon forward sale contracts (e.g. 10 yr FWD sales)
 - Include timber and forest grazing regimes
 - PFSI forests greater environmental co benefits - appeal to voluntary carbon markets = higher prices
 - Carbon-neutral farming – marketing opportunities



Source: Carbon Forest Services

IRR Example- Timber Forest + Carbon (averaging)

Effect of Averaging on Timber Forest Returns

- Front end carbon income lifts IRR by 4 – 6%
- No carbon liability risk
- Little or no need for carbon insurance

At \$4000/ha, land accounts for c. 2/3 of total upfront costs.

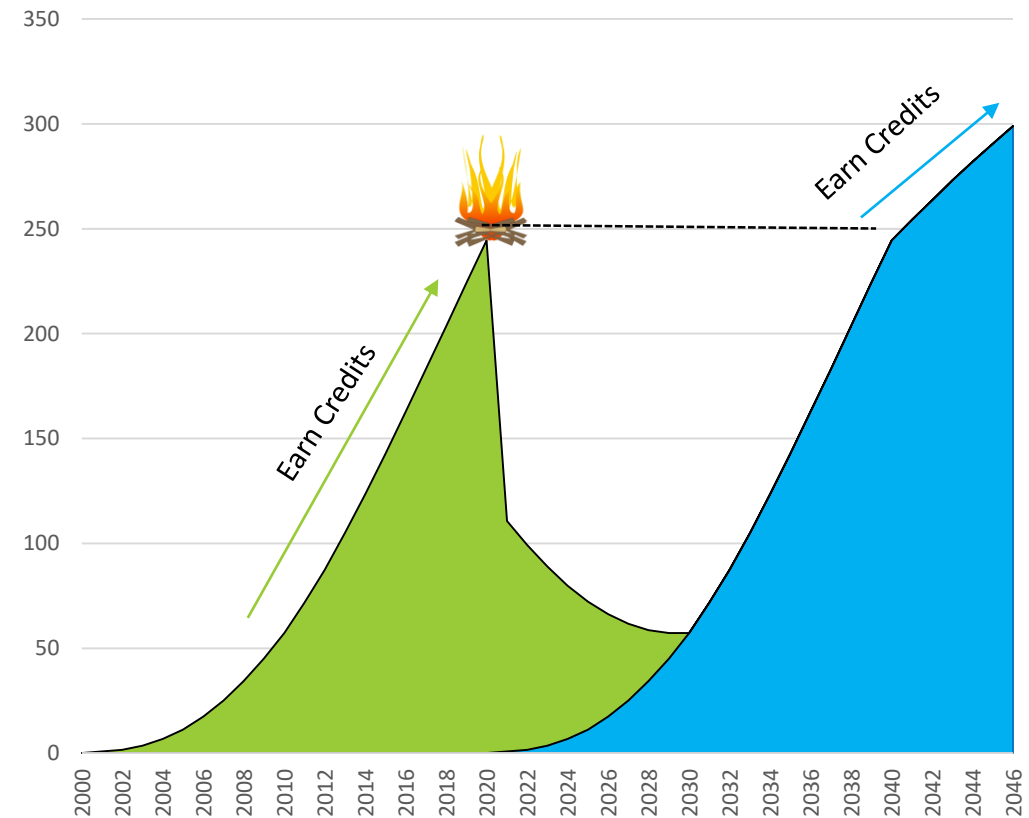
Low value marginal land can have far higher returns



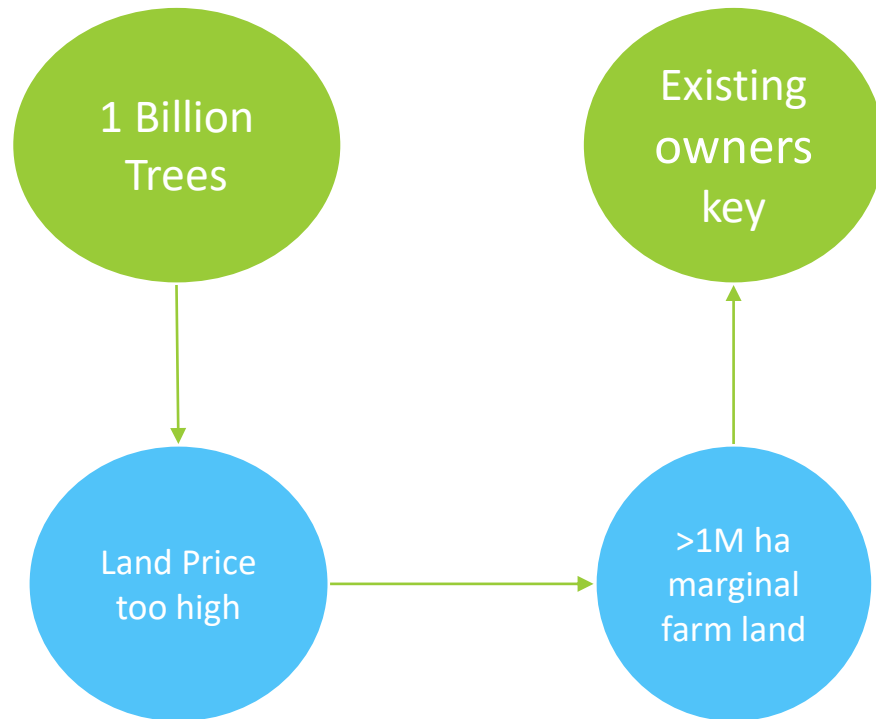
	Land @ \$4000/ha
Timber Only	5.7%
Timber+Carbon (averaging)	9.9%

New Rules- Permanent Forests

- Permanent forests receive full carbon stock allocation
- No carbon liability if adverse event- BUT
- Forest must be re-established
- No credits earned until forest recovers to pre-adverse event carbon stocks
- No need for carbon loss insurance
- But still may want lost carbon income insurance (i.e. future carbon insurance)



Land Availability Challenges



Problems:

- Wholesale conversions of farms to forest
- High NZU price pushes up land prices

Solutions: a win-win opportunity for farming

- Key to success is integration of carbon forestry onto marginal land within farms
- Not displacement but complimentary to current land use -Land use optimisation
- Trees in right place can deliver co-benefits
- Prospect of strong extra income stream, e.g. >\$1000/ha/an
- Achieving Net Zero needs buy-in from rural sector communities
- Forestry Financing options, 1BT Grants, or JV's

Planning for Carbon Forestry on Farms

Identify low value problematic land areas within farm (assign realistic LEV)

Identify and model optimal species/regimes options for carbon and timber, PFSI forest, and/or ETS forest

Evaluate prospective costs and returns (IRR's and cash flows) from sales of carbon and/or timber

Appraise financing options, BT Grant eligibility, JV financing, Forward Contracts, leasing

Utilise professional advice, Farm advisory, Accountancy, and Forestry.



Dairy High Value Land - Challenges



Oreti, Southland, 20 yr Euc regnans, 100 stems/ha

Problem: High value land uneconomic for carbon forestry

Solutions?

Wide spaced woodland forest grazing plantings and shelter plantings that also provide for animal shelter/welfare

Invest off the farm via JV's on marginal lands with other farmers, or purchase or lease marginal land blocks for carbon forestry.

Woodlands/Forest Grazing

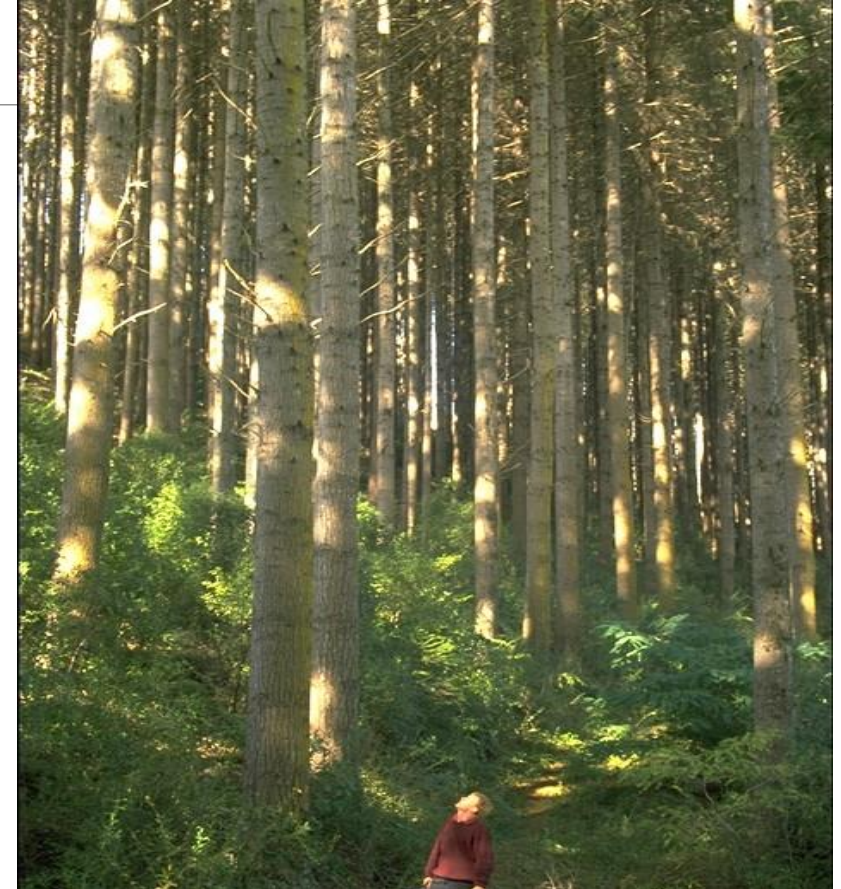


Waipori, Otago, 14 yr Euc nitens, 200 stems/ha

Radiata not the only option -



Cantab hill, 1000mm rainfall, Eucs outperforming radiata



Roos Ck, Dunedin, 85 yr old D-fir, prodn thinned, note strong native understory (>. 2500 t CO₂/ha)

Radiata not the only option -



110 yr Mixed species plantings
Hanmer Forest Walk (c.1500 t
CO₂/ha)

Conclusions:

- Major momentum in climate policy (Paris/ZCB/1BT)= good for carbon forestry
- NZU Price is high and projected to significantly increase
- Net Zero target requires >1M ha of new fast sequestering carbon forests = more land
- Need to 'on board' farmers who own the suitable (marginal) land resource
- Barriers / Risk to participation being met with ETS Review
- Averaging avoids harvest liability, and new PFSI scheme with no repayment liabilities
- Can de-risk by utilising BT grants, joint ventures, or long term forward contracts
- Get advice from carbon and forestry experts...identify best options for your farming business
- Farmers/landowners are in the 'box seat' for carbon forestry opportunities
- Current Future carbon price looks rosy but you never know what will happen!

Radiata not the only option -



110 yr Mixed species plantings
Hanmer Forest Walk (c.1500 t
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THANK YOU!

QUESTIONS?

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