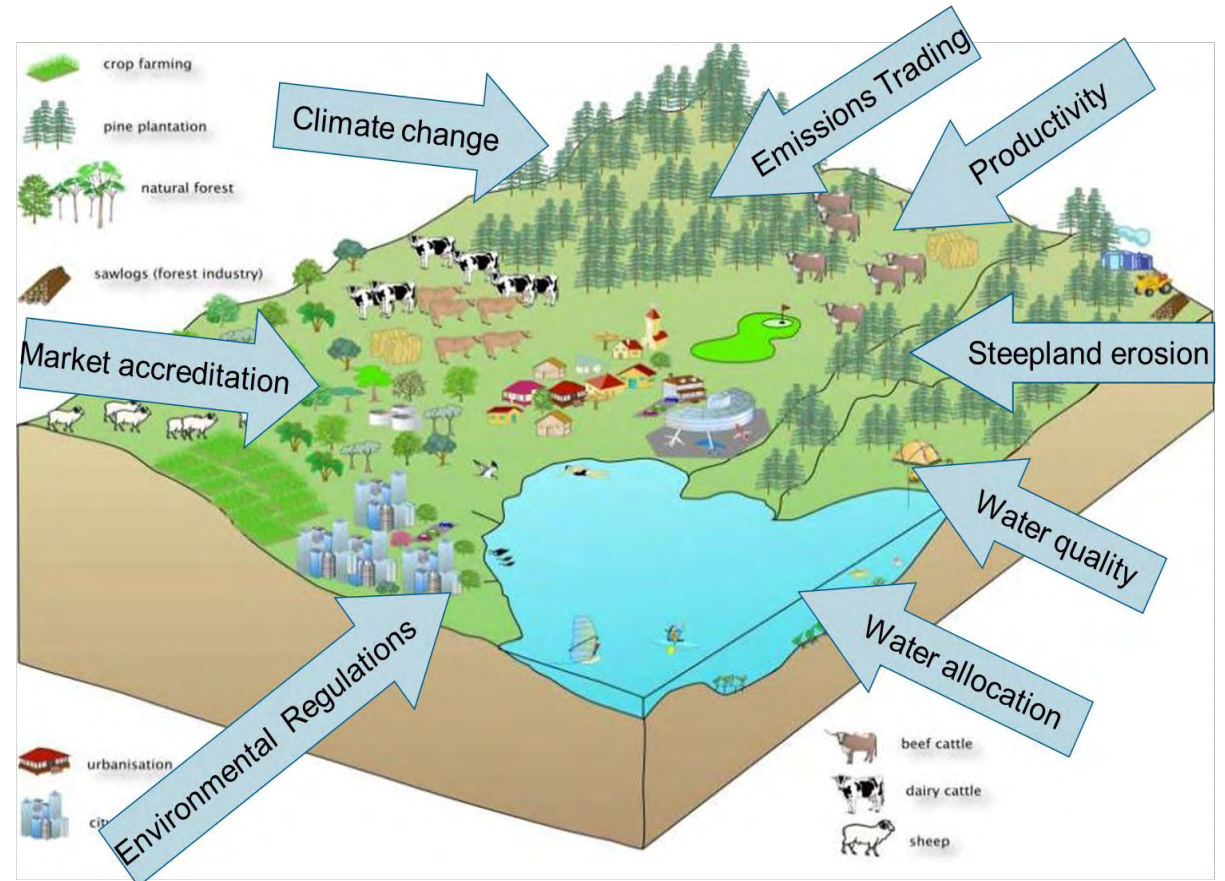


The Billion Trees Programme and trees on farm

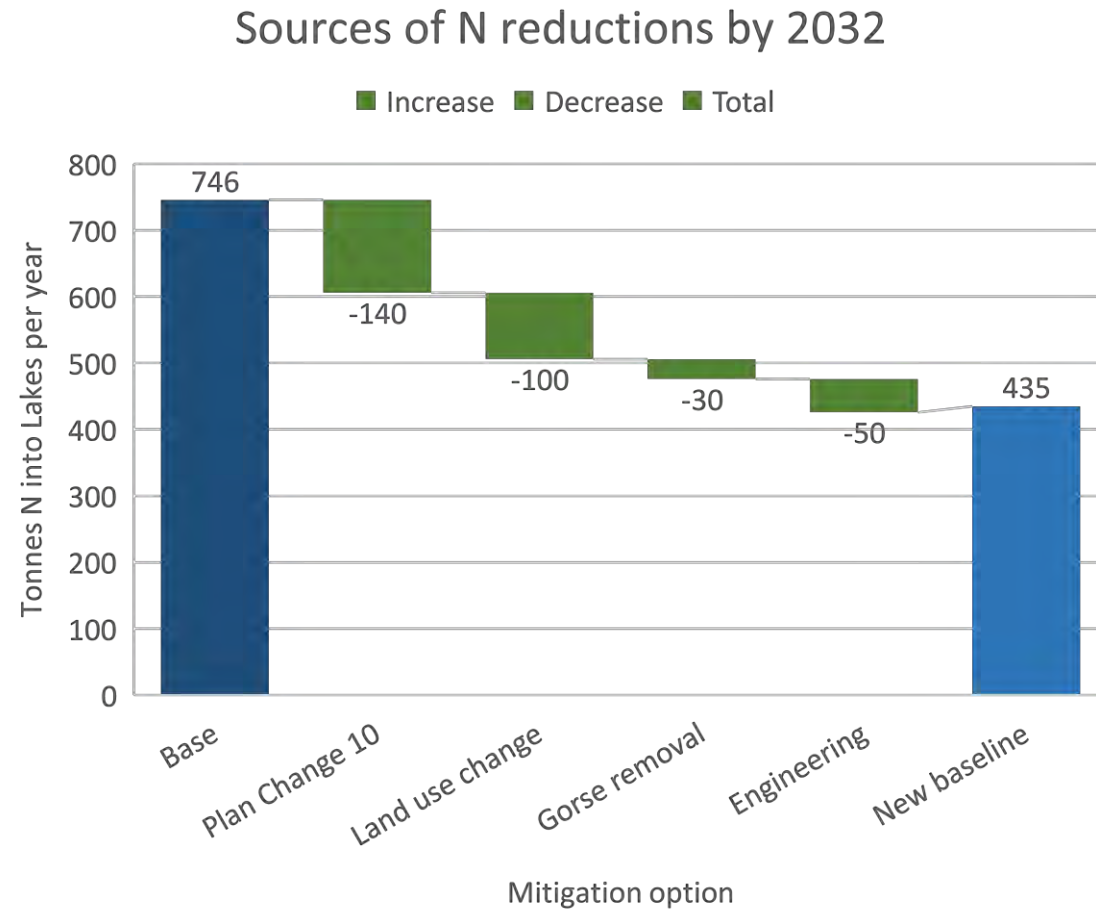
Warren Parker

Overview

- Role of trees on farms
- Billion Trees Programme
- Emissions Trading Scheme (ETS)
- Tips for 'right tree, right place; right purpose'
- Wrap-up



Nitrogen (N) removal from Lakes' Catchments



NATIONAL POLICY STATEMENT

for Freshwater Management 2014

issued by notice to public on 4 July 2014

newzealand.govt.nz






Role of trees

- Reduce nutrient & sediment (erosion) losses;
- Reduce greenhouse gas emissions;
- Increase-restore biodiversity
- Beautify the farm (Aesthetics and landscape)
- Build farm's biophysical resilience
- Diversify income, improve farm value



Trees generate ecosystem services which can be monetised

- New markets for land-owners
 - Carbon
 - Water & nutrients
 - Biodiversity (e.g. AirNZ)
 - Recreation



GROWING CARBON LOCKUP

Dairy cows are responsible for about a quarter of New Zealand's greenhouse gas emissions.
That's the cost of supplying the world with dairy products.
But it doesn't have to be.
Planting forests is an easy way to offset greenhouse gas emissions from livestock.
An average dairy farmer could plant nearly two hectares a year in radiata pine to totally offset the gases their cows make. It wouldn't even have to be on their own land.
The farmers profit from the trees at harvest – and then replant.
There's a lot of win in this package.

www.nzwood.co.nz

MOVE OUR FORESTS
DATE 20/06/2014 09:00

 **NZ wood**
20/06/2014 09:00

Billion Trees Programme: Vision & objectives

“To drive a transformation of New Zealand forestry that will deliver improved social, environmental and economic outcomes”

Planting a mix of native and exotic trees to:

- Deliver sustainable regional economic growth and jobs
- Provide opportunities for Maori to use their land and resources
- Support tourism and infrastructure development
- Help meet our international climate change commitments
- Increase indigenous biodiversity and beautify landscapes
- Protect and improve soil, water and other natural resources

One billion trees – Reclaiming our forest heritage

New Zealand Government

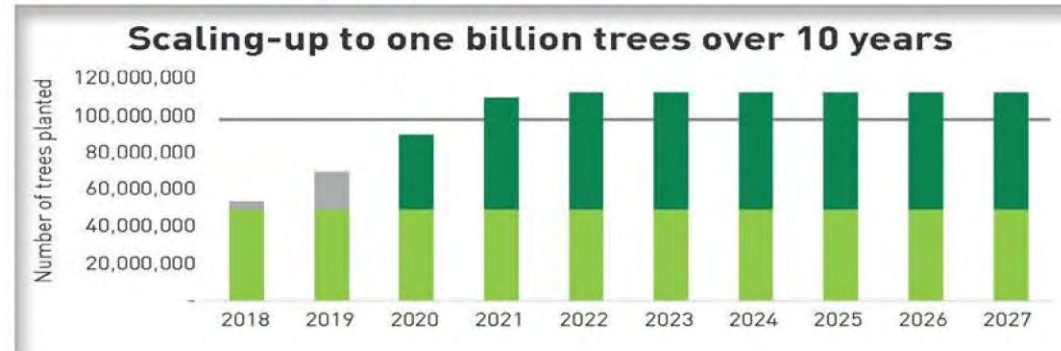
It's about:



It requires:



It's a 10 year programme:



- Additional planting enabled by the programme to date
- Additional planting the programme will need to deliver, approach for delivering the planting yet to be confirmed
- Baseline forecast of trees to be planted (including replanting)
- Average annual planting over 10 years

We'll do it together:



Commercial sector
Base planting of 50 million/year projected



Coalitions
Government departments, Māori and NGOs working together



Crown Forestry
Lease or joint venture
Existing and new foresters
Commercial criteria
Land size, terrain, accessibility
Radiata crop



Ministry for Primary Industries funding
Afforestation Grant Scheme
Erosion control funding programme
Hill country erosion programme
New grant mechanisms



Crown land
Department of Conservation



Skills and training
Jobs
Career pathways



Regional Councils
Catchment assessments
Infrastructure
Funding and partnership initiatives
Riparian and gully planting



Community participation
Schools, plant nurseries and farmers

We'll plant:
Natives and exotics in traditional and innovative locations

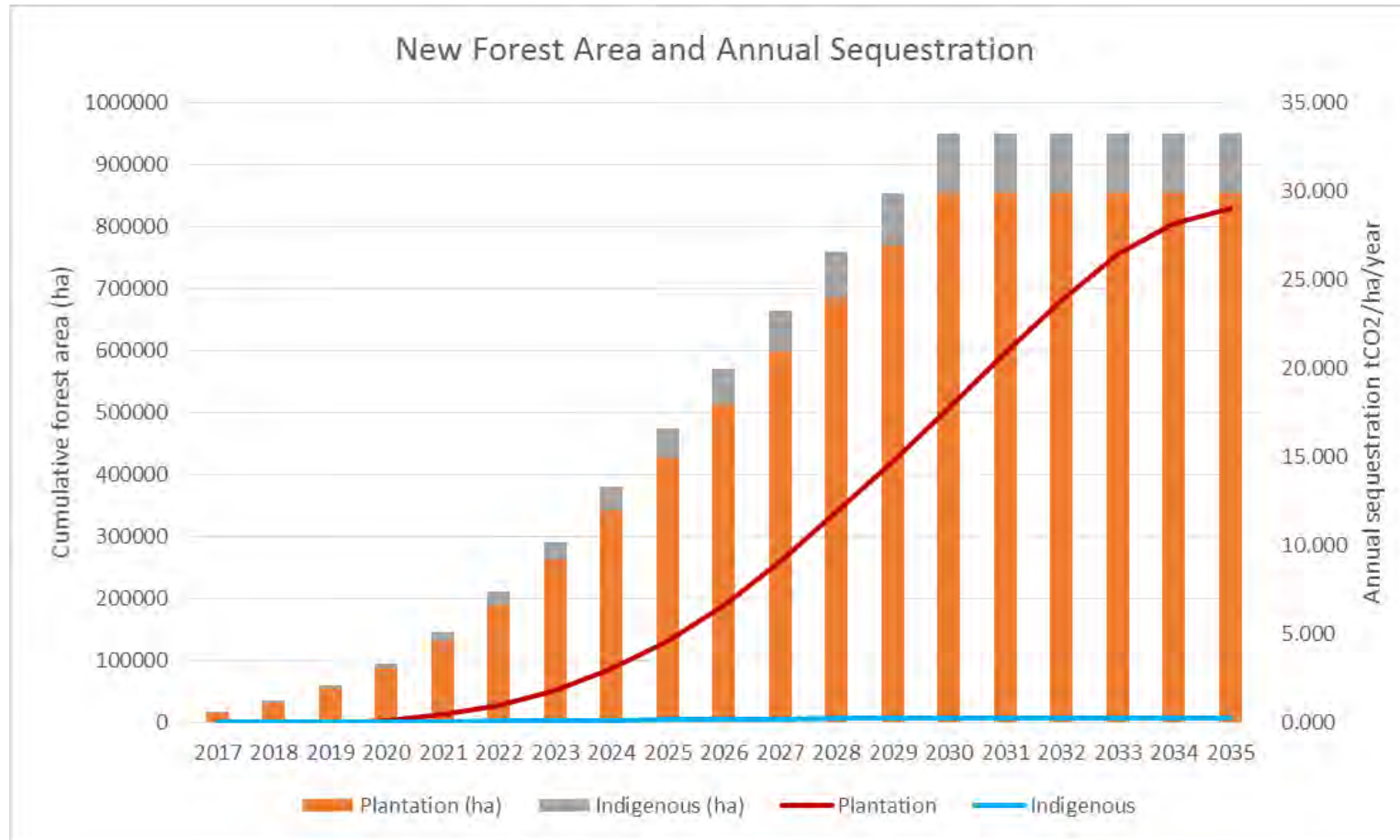
Billion Trees
is critical to
meeting
Paris 21
Agreement
target

New Zealand's National Determined Contribution (NDC) is to reduce national 2005 GHG emissions by 30% by 2030, or about 11% below 1990 levels

NDC commitment is expected to increase at 5 year intervals (need to secure a further 1°C temperature rise GHG reduction from signatories in order to hold to a 1.5°C rise by 2050)

Tougher than first appears – forest removals > forest C stored from early 2020's

Value of larger forest estate



Establishing 1 m ha by 2030 could offset 28% of total emissions by 2030

2032 – Exotic	Indigenous	C (\$25/t)	Stumpage (\$100/m3)
+855,000ha	+95,000ha	\$2.9B NPV	\$8.1b NPV

(Source: Steve Wakelin, Scion)



Billion Trees – Ensure: “Right tree, right place, right purpose (& scale)” – lessons from the 1990s & account for climate risk



Te Uru Rākau

Forestry New Zealand

Basics of the ETS for forests

Integrating trees into the farm system



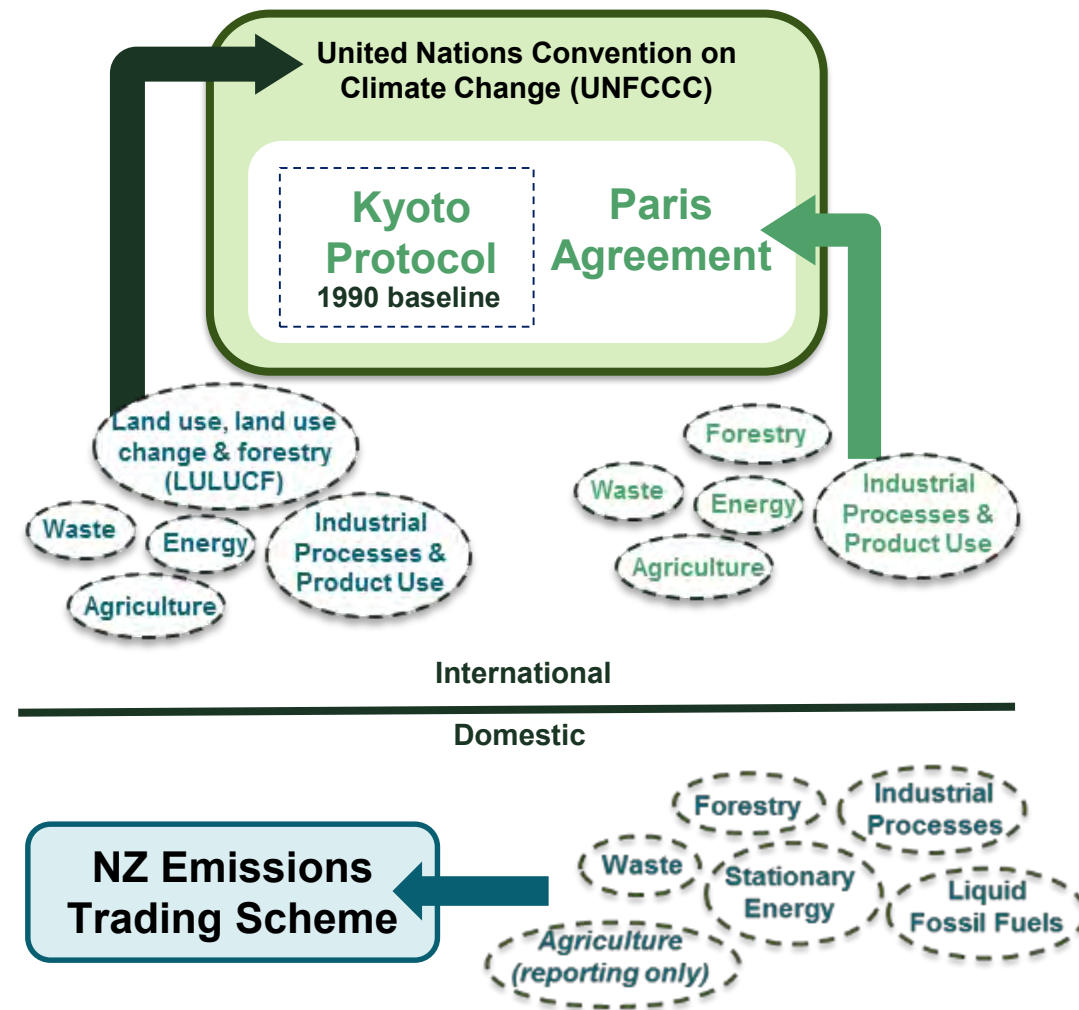
ETS

The ETS is a domestic market (price on C) designed to reduce our net emissions so we can meet our international targets.

Comprehensive - All sectors, all gases

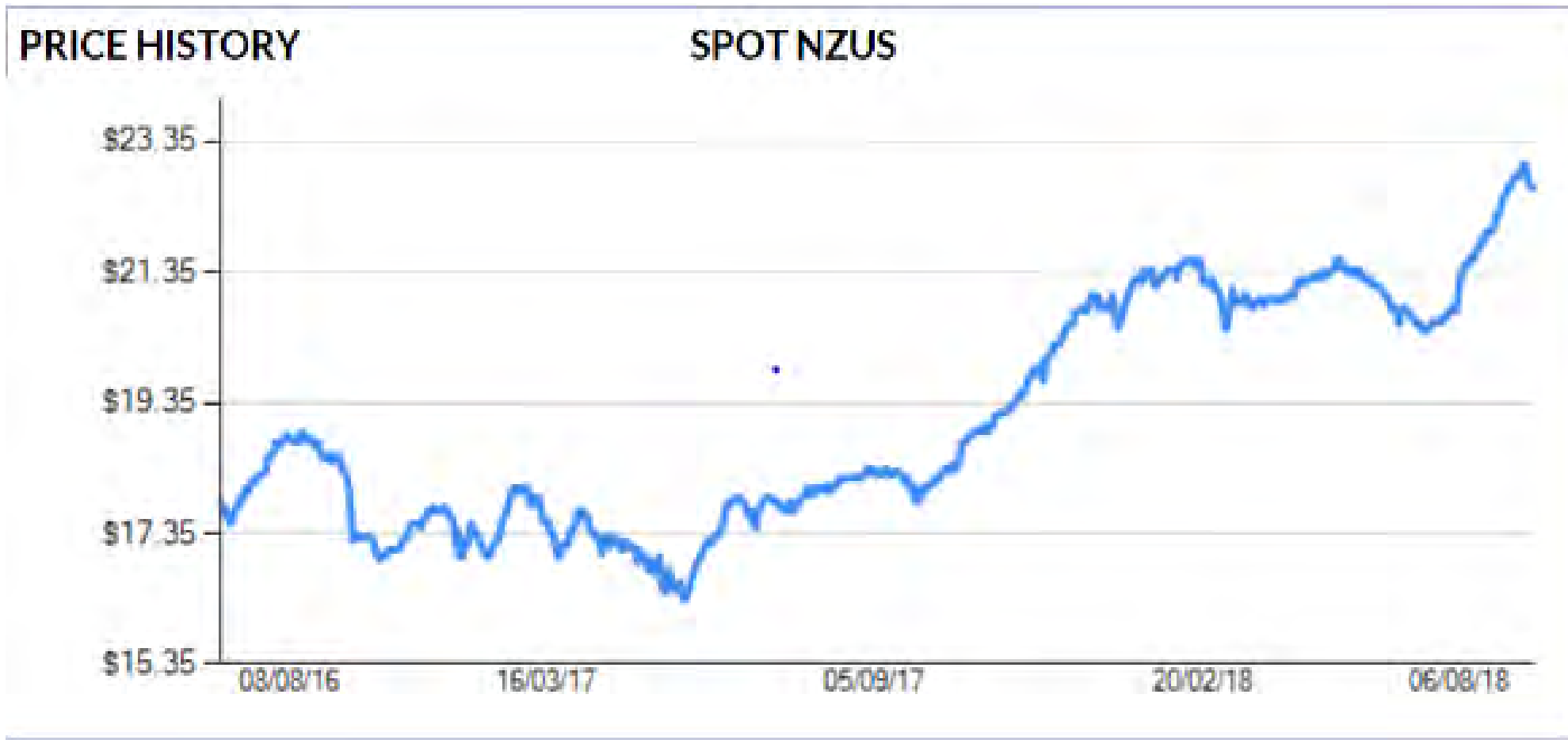
The sectors and settings in the ETS closely align with what we agreed to account for internationally.

Planting more forests is the cheapest way for New Zealand to meet its emissions target



Carbon prices

ETS policy remains uncertain – agriculture in the ETS from 2019.



6 August
\$22.70

Carbon stored & price effect

Pinus radiata pruned forest, post 1990

Rotation age (years)	Total volume (m ³ /ha)	Carbon stored (t/ha)	IRR with carbon (%)	IRR without carbon (%)
25	695	804	11.8	4.9
30	886	1002	11.8	4.8
35	1050	1176	11.6	4.6

Assumptions

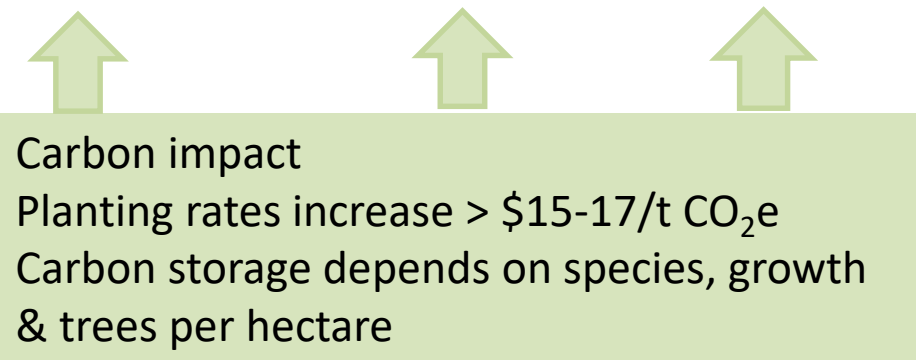
\$25/t CO₂ equivalent ave over 2nd rotation

CPI adjusted log prices at March 2018

Average transport distance of 80km

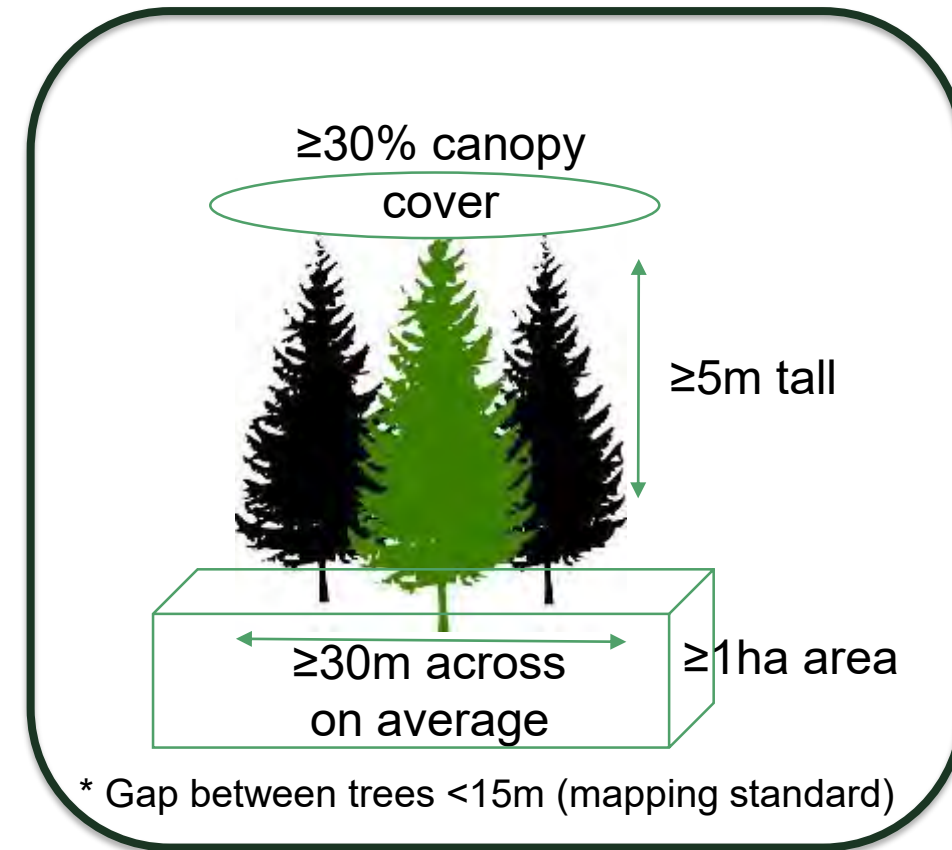
\$35/m³ harvest cost

\$1500/ha roading cost



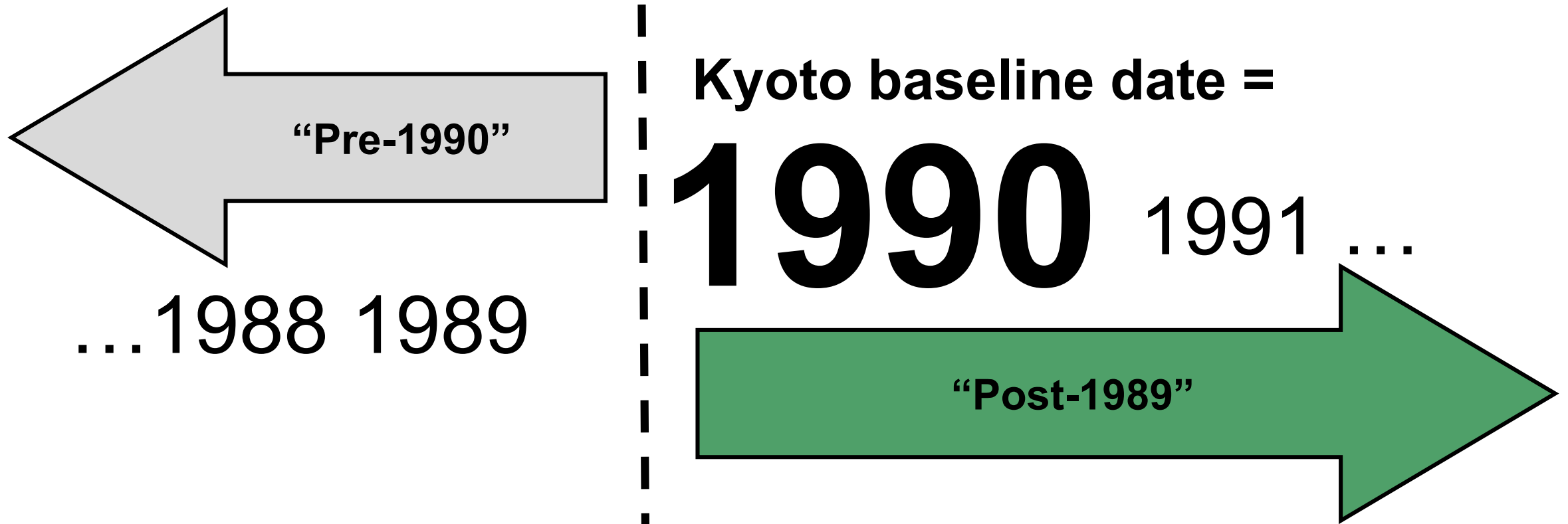
What is a forest in the ETS?

- Is made up of **1ha or more of forest species** – a forest species is one that can grow to **at least 5m height at maturity** where it is located; and
- Can achieve a **tree canopy cover of at least 30% in each hectare** at maturity; and
- Can achieve an **average tree canopy width of at least 30m** at maturity.



Types of forest in the ETS

The baseline date for net emissions is **1 January 1990**, agreed in the Kyoto Protocol. This creates **two types of forest** which are treated differently in the ETS.



Pre-1990 vs Post-1989 forest land

‘Pre-1990’ forest

- Are exotic forests **established before 1st January 1990** (considered baseline forest)
- **Do not earn NZUs** (received an allocation)
- **Can harvest and replant without surrendering NZUs**
- **Automatically in the ETS if they are deforested** (i.e. change land use) and **NZUs must be surrendered** (some exceptions for <50ha)
- **Indigenous forests not included** (managed under the RMA and Forests Act)

‘Post-1989’ forest

- Are exotic or indigenous forests **first established after 31st December 1989** (considered new forest)
- Can **voluntarily register these forests with the ETS** to earn NZUs
- Must **surrender portion of NZUs earned after harvest** to reflect loss of carbon stock
- Must **surrender all NZUs earned if the forest is deforested**



Planting for carbon credits

**Post 1989
forest =**

**≥1ha of forest species
that can reach 5m
height at maturity**



**Capable of reaching at
≥30% crown cover in
each ha at maturity**



**Capable of reaching an
average 30m crown
cover width at maturity**



**First established or
regenerating after 31
December 1989**

**There is lots of flexibility in how to meet the criteria. Strategic planting
can maximise potential carbon returns**

Connect narrow/small areas (riparian buffers, shelterbelts, wetlands) to bigger areas (e.g. forests, gullies)



If space-planting gullies or eroding slopes plant a few more trees and connect planting up to create a much larger overall area.



Establish multiple age classes or have both commercial and permanent forest to maximise “low risk” units.



Examples of post-1989 forest eligibility

20 hectares radiata pine planted in July 1990 into paddocks grazed since the 1960s. **Livestock numbers before planting were enough to stop regeneration** of any forest species.



'Post-1989' forest land,
established in July 1990

5ha back paddocks grazed since the 1970s, with **enough livestock to stop growth** of any forest species. **Livestock were removed in early 1991** and extensive mānuka seedling regeneration visible over the whole area by 1994.



'Post-1989' forest land,
established in 1994

5ha gully originally indigenous forest but was converted to farmland in the 1930s. It was **farmed until the early 1980s then abandoned** and was left to revert to indigenous forest and is **still in forest today**.



Indigenous forest
established before 1990 -
NOT 'post-1989' forest land

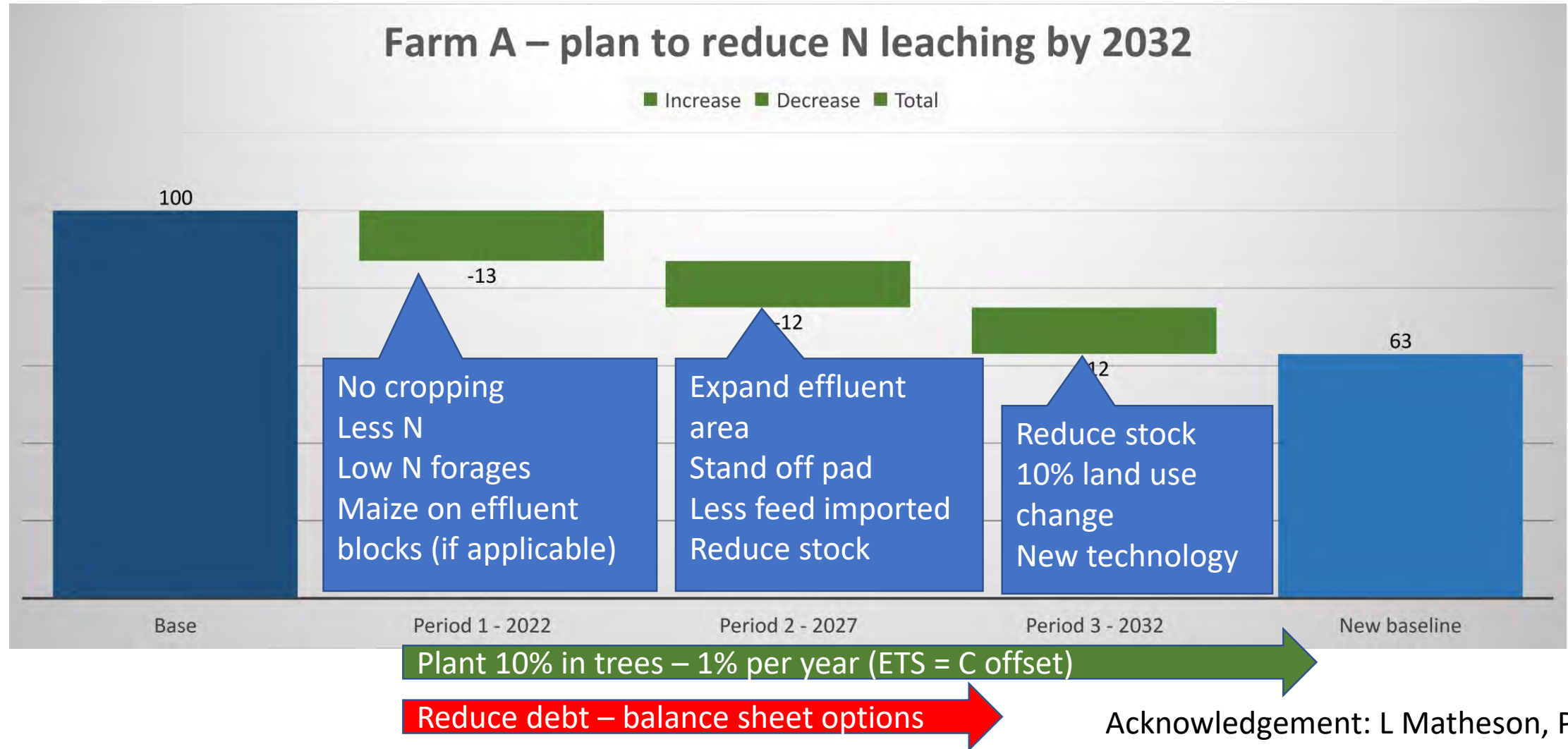
Managing change

Practical things for you to try



Break the challenge down –

Note: Plans will be farm & farm system specific



2b. Identify and rank your reduction options

N reduction option	Size of gain	How easy/costly	Period
Nutrient budget OVERSEER	Medium	Easy (less & better use of fertiliser)	1
Maize on effluent areas	Small	Easy	1
Reduce stock – 0.1 cows/ha	Medium	Easy	2 & 3
Reduce stock - 0.2 cows/ha	Medium	Hard	3
Land for trees	Large	5 ha easy; 10 ha harder	1 & 2
Breed cows for low N	Small, steady	Easy?	1
Establish a wetland	Medium	Medium	2
Plantain, N efficient grasses	Small-medium	Small-medium	1, 2, 3
N winter crop	Medium	Easy	1
Build a stand-off pad	Small	Medium	2

Tips for planting success

- Put the majority of your effort in planning
- Consider the long term use of your trees, e.g. access for harvest.

Information and advice

- DairyNZ 'Trees on Farms' guides + extension officers
- Regional council websites + land management teams
- NZ Farm Forestry Association (*good for alternative exotic sp.*)
- NZ Institute of Forestry
- NZ Poplar and Willow Research Trust
- Tane's Tree Trust (*good for info on native sp.*)
- Te Uru Rākau/MPI
- Mānuka and Kānuka Plantation Guide

Map out your vision

Get advice, do research

Plan sequencing

Plan species choice and placement

Land preparation

Select healthy seedlings

Best practice planting

Ongoing maintenance

Pest and weed control

Replace failed seedlings

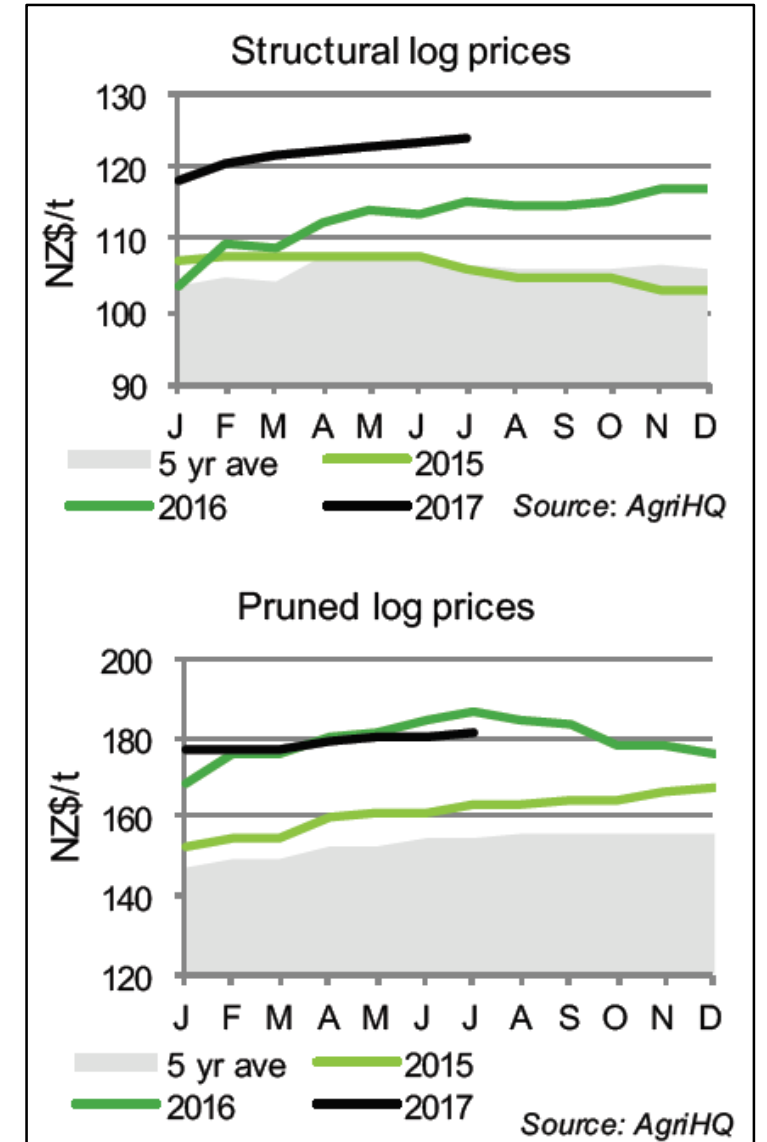


An aerial photograph of a rural farm landscape. The land is divided into various fields, some of which are green and others brown, indicating different stages of cultivation or land use. A central area features a cluster of buildings, including a prominent red-roofed structure. The fields are separated by narrow roads and hedgerows. The overall scene depicts a typical agricultural setting.

A farm map and spatial plan is a good place to start

Source: <http://www.farmmapping.co.nz/>

What market
am I targeting?
Timber, Carbon,
nutrient offset





Will trees be profitable?

Case study – Rotorua

	Dansey Road
Distance to export port	67 km
- domestic mills	63-90 km (Kinleith, Taupo)
Logging difficulty	Moderate, ground based
Age of trees at harvest	31 years, pruned to 6m, thinned
Net area harvested	3.5 ha
Volume recovered	665 t/ha
Logging & cartage costs	\$22-33 /t
Cartage distance & costs	63-93km & \$16.15-\$21 (self-loader)/t
Net return after all costs	\$204,000 or \$58,286/ha

Case study – Rotorua (rule 10)

Overseer 6.2.3, no problems for Nick!!

Land use	Area (ha)	N Loss (kgN/ha/yr)	Total N loss (kg)
Pasture	219	17-20	2925
- turnips	3-5	144-152	715
Radiata pine	73	7	523
Native	71	3	226
House/other	3	15	15
Total	316		4404

Year	NDA
2016 (s)	6627
2022-2027	6038
2027-2032	5597
'Scope'	1193
+ pine adj	292

Change to land owner balance sheet

Asset	2032
Land & improvements	↓ ?
Plant & Equipment	=
Livestock	High BW, low N
Chain shares (value add margin)	++
Environment & landscape	C, N, water, biodiversity

**Banks now value/lend on 'water rights';
pre-purchase compliance WoF**

Concluding remarks

- One Billion Trees – “nation building”
 - 500,000 ha new plantings
 - 500,000 ha replanting
 - Exotics and natives
- Emissions Trading Scheme (ETS)
 - Agriculture to come in
 - Can add value (NZUs) to farm business (balance sheet)
 - Understand rules – what qualifies

Concluding remarks

- Understand the job to be done (size of nutrient reduction)
- Figure out where trees fit and the role you want them to play
 - Plant right tree, right place, right purpose
 - Plant over 5-10 years (spread cost; mixed age classes; learn what works)
- ETS – register?
- \$ support – BoP RC, MPI – PFSI; AGS