Forestry Presentation

Wednesday 28 July 2021

Glossary of Forestry Terms

Clearwood – Sawn lumber with no defects recovered mainly from pruned logs

Clearfell – Harvesting all trees in a forest

Continuous Cover – Continuous canopy cover in a forest

Carbon Forest – Forest registered in the Emissions Trading Scheme that may or may not be harvested

Production Plantation Forest – Forest grown and managed to be Clearfelled

Exotic Forest – species not native to New Zealand (eg Radiata pine)

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NZ Exotic Forest Summary

Area and standing volume statistics	As at 1 April 2017	As at 1 April 2018	As at 1 April 2019
Forest area			
Net stocked area (ha)	1,706,429	1,704,494[1]	**1,696,584**
Growth characteristics			
Standing volume (000 m^3)	472,715	482,511	**494,618**
Average standing volume (m^3/ha)	277	283	**292**
Area-weighted average age (years)	17.39	17.63	**17.91**
Area by species[3]			
Radiata pine (ha)	1,535,510	1,532,444	**1,525,711**
Douglas-fir (ha)	103,726	104,258	**103,410**
Cypress species (ha)	9,855	9,928	**9,825**
Other softwoods (ha)	22,539	23,378	**23,381**
Eucalypts (ha)	22,307	22,148	**21,777**
Other hardwoods (ha)	12,492	12,339	**12,481**

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Source: www.nzfoa.org.nz

Radiata Pine

- Most common NZ exotic plantation species (1.7 million ha)
- Significant R&D on tree stock, management, harvesting & processing
- Relatively short rotation (23-28 years)
- Full log use – Sawlog, treatment, pulp
- Excellent machining – cutting, drying, planning, gluing
- High acceptance in overseas markets – plantation forest, pine, clearwood
- Established infrastructure – harvesting, transport, mills, export
- High carbon sequestration
- Mono-species exposure to pests & disease

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Alternative Forest Options

Redwoods

- Approx 4000ha stocked plantation areas
- Plantations established by US companies with existing end market
- Proven growth and performance – 35-45 year rotation
- Carbon sequestration similar to Radiata
- Log price est +$20/tonne vs Radiata

Eucalyptus

- Common hardwood species in NZ (22,000ha), mainly for chip
- Hardy, high growth rates
- Some species have good timber characteristics, some terrible
- Higher carbon sequestration
- Log price est -$15/tonne vs Radiata

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Minor Plantation Species

Other pines; *P. nigra, P. muricata, P. ponderosa*

Other softwoods; *Redwoods, Larch, Cryptomeria, Cypress*

Indigenous species[1]; *Kauri, Tōtara, Beech*

Other hardwoods; *Poplars, Acacia, Willows, Black Walnut, Paulownia, Oaks*

Non-durable eucalypts; *E. obliqua, E. fastigata, E. regnans, E. nitens, E. saligna, E. botryoides, E. pilularis, E. muelleriana*

Durable eucalypts; *E. globoidea, E.bosistoana, E.quadrangulata.*

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Source: NZ Forest Owners Association
Facts & Figures 2019/20

Alternative Forest Options

Native (Indigenous) Species – mainly Totara, Kauri & Beech

Pros

- Funding becoming available for planting(?)
- High end established market
- Must register with MPI if planted as a production forest

Cons

- Slow growth rates (40-80 years)
- Expensive to plant and manage
- Low Carbon sequestration
- Risk of law change on plantation registration

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Exotic Forest Returns - Radiata

- Outputs are dependent on inputs
- Get advice!
- Net returns heavily dependant on costs of extraction and transport costs
- Focussed forest management will yield higher grade recovery
- Thinning is ESSENTIAL, Pruning recommended but optional
- Have management plan when you plant – manage to identified markets
- Health & Safety and Environmental compliance MUST be considered when making establishment & management decisions

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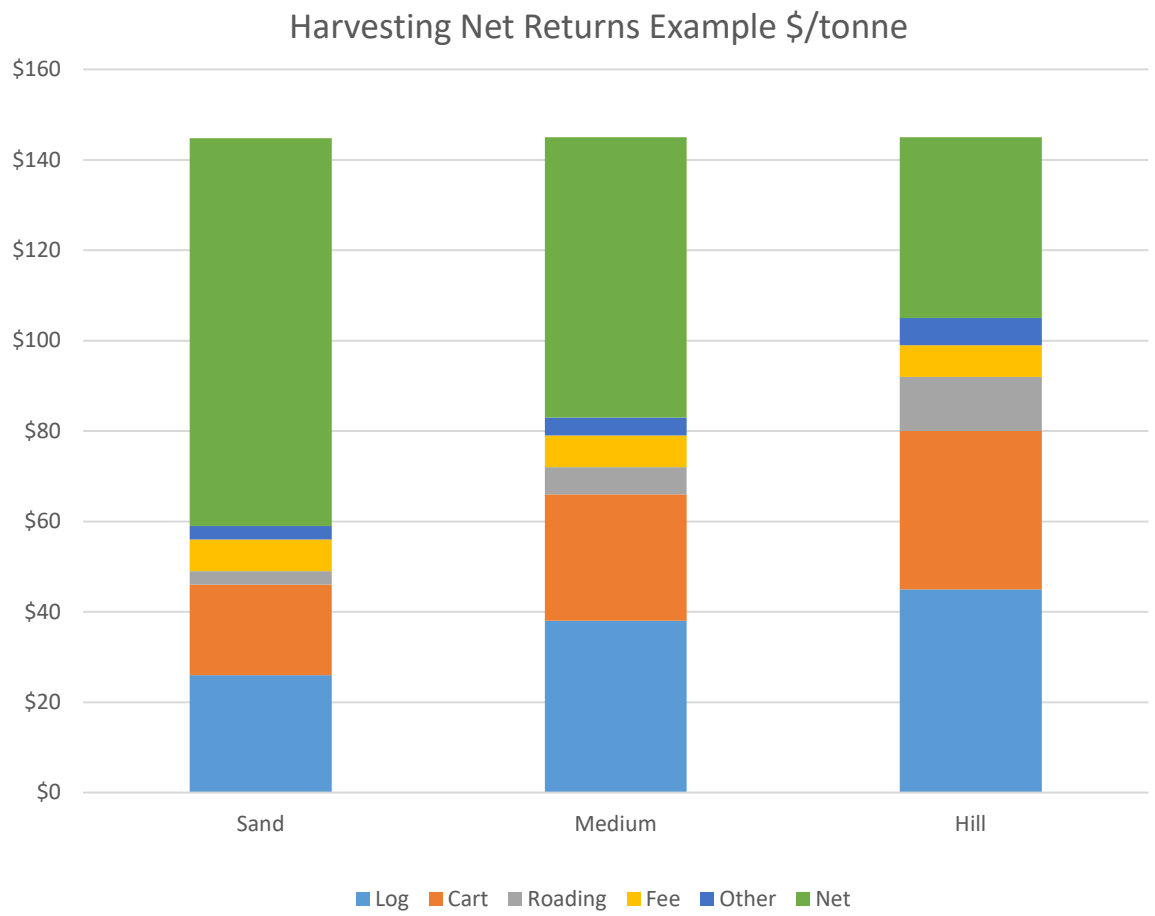
Example Logging Returns – Radiata $/tonne



	Sand	Medium	Hill
Ave Log Price	142	142	142
Log	$26	$38	$45
Cart	$20	$28	$35
Roading	$3	$6	$12
Fee	$7	$7	$7
Other	$3	$4	$6
Net	$86	$62	$40

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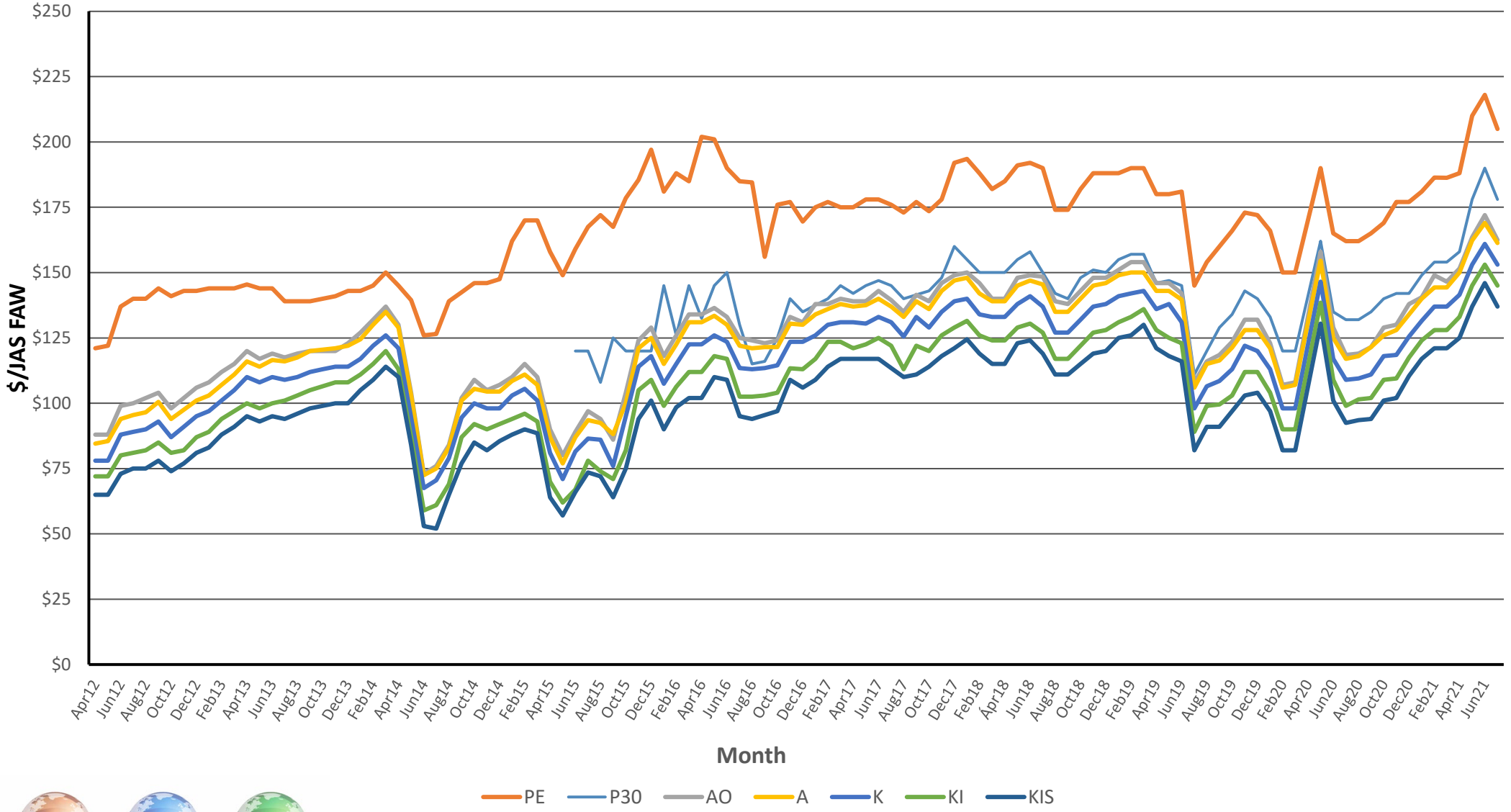
Source: Transglobal Connections Ltd

Spot Log Price AWG $/JAS ex Port of Wellington



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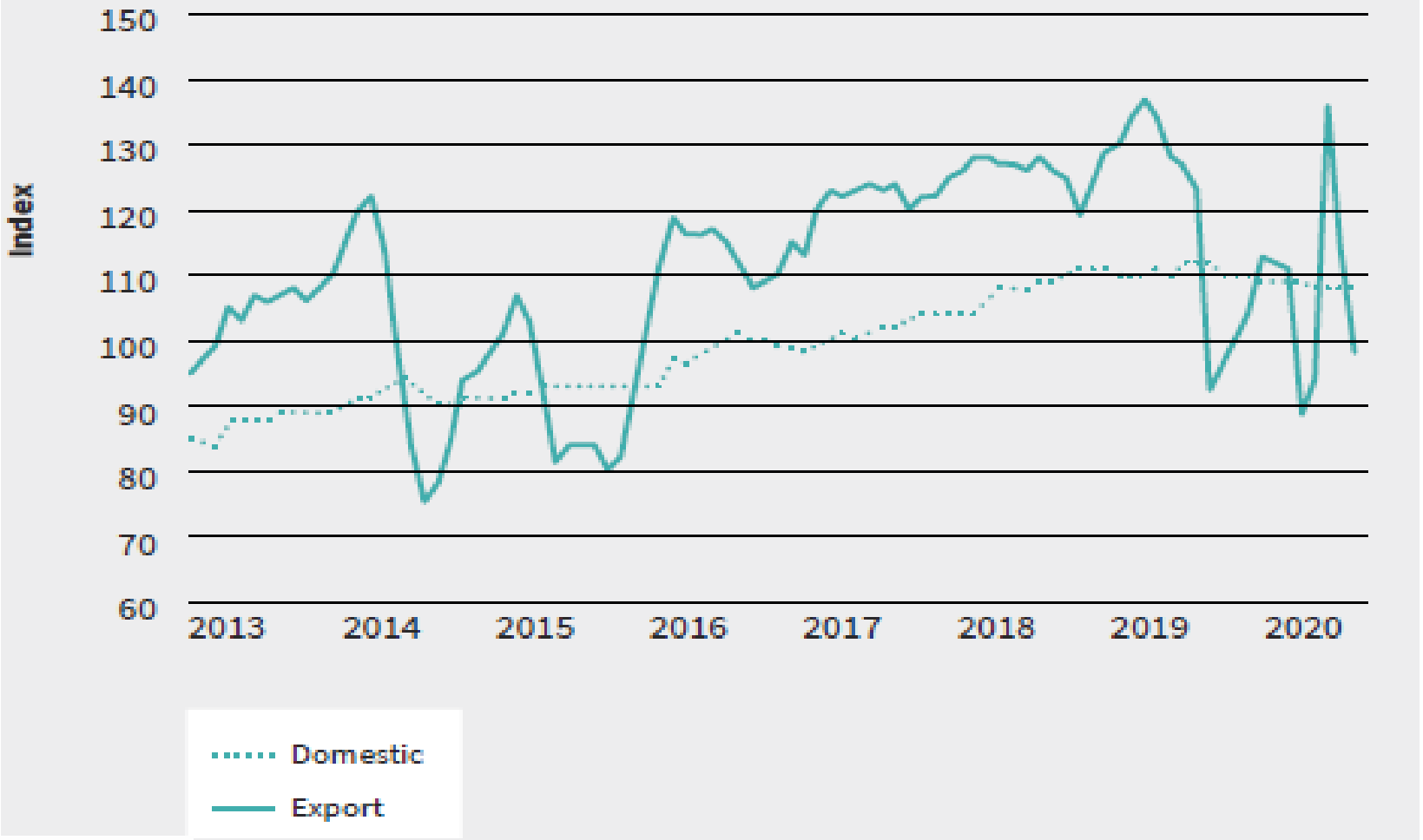
Source: Alan Bell & Associates

Export and Domestic Log Prices

for Year Ended June



Source: NZ Forest Owners Association
Facts & Figures 2019/20

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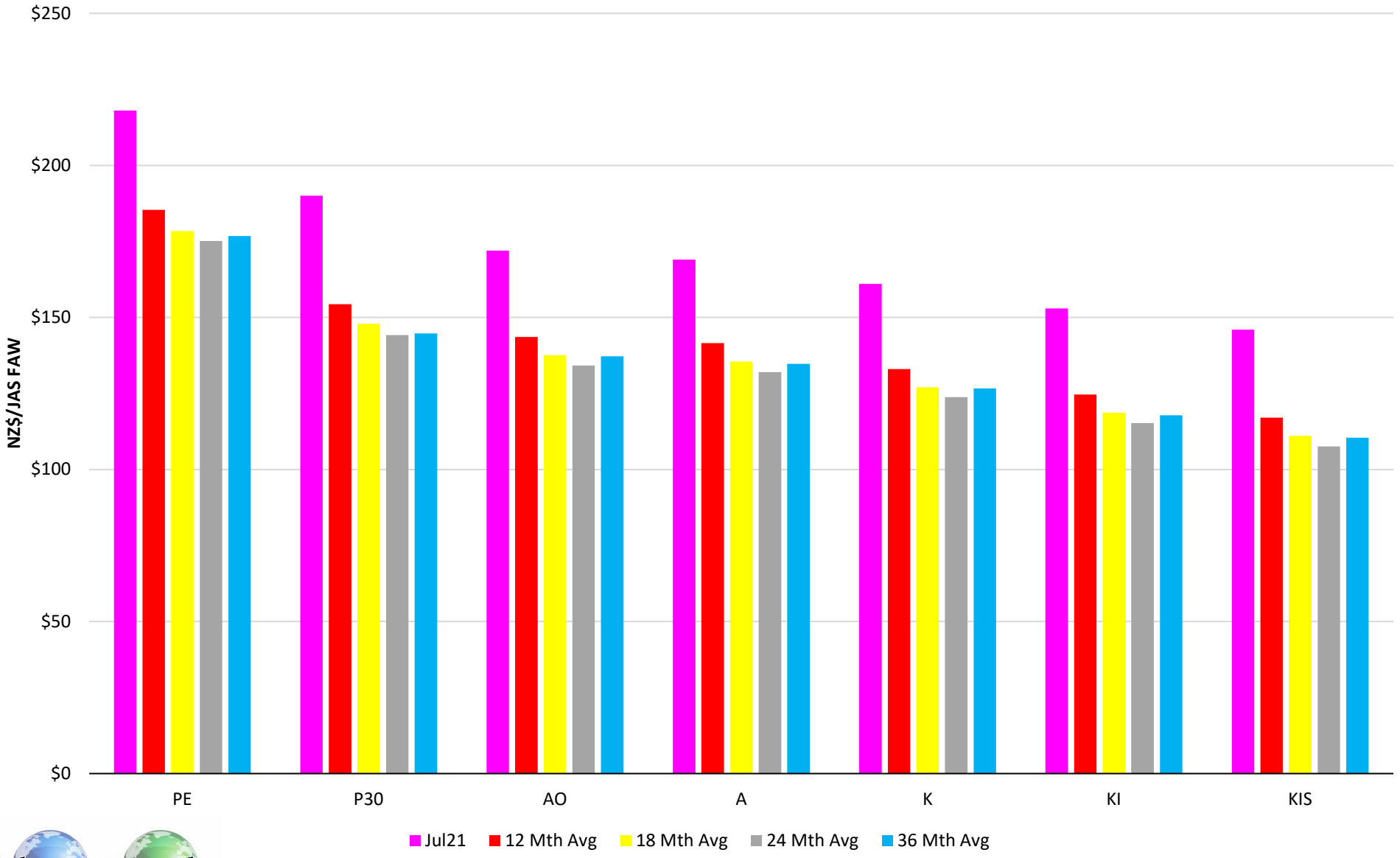
Average Export Prices ex Wellington at July 2021



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Source: Alan Bell & Associates

Emissions Trading Scheme (ETS)

- First rotation only on bare land at 1990
- Three main variants:
  - Carbon Accounting (Sawtooth) – not available from 2023
  - Averaging
  - Permanent Post89 (50 years)
- Minimum 1ha in area
- Width wider than 30m for minimum area
- 30% canopy area at maturity (max 15m between edge of canopy)
- Species must meet ETS specification

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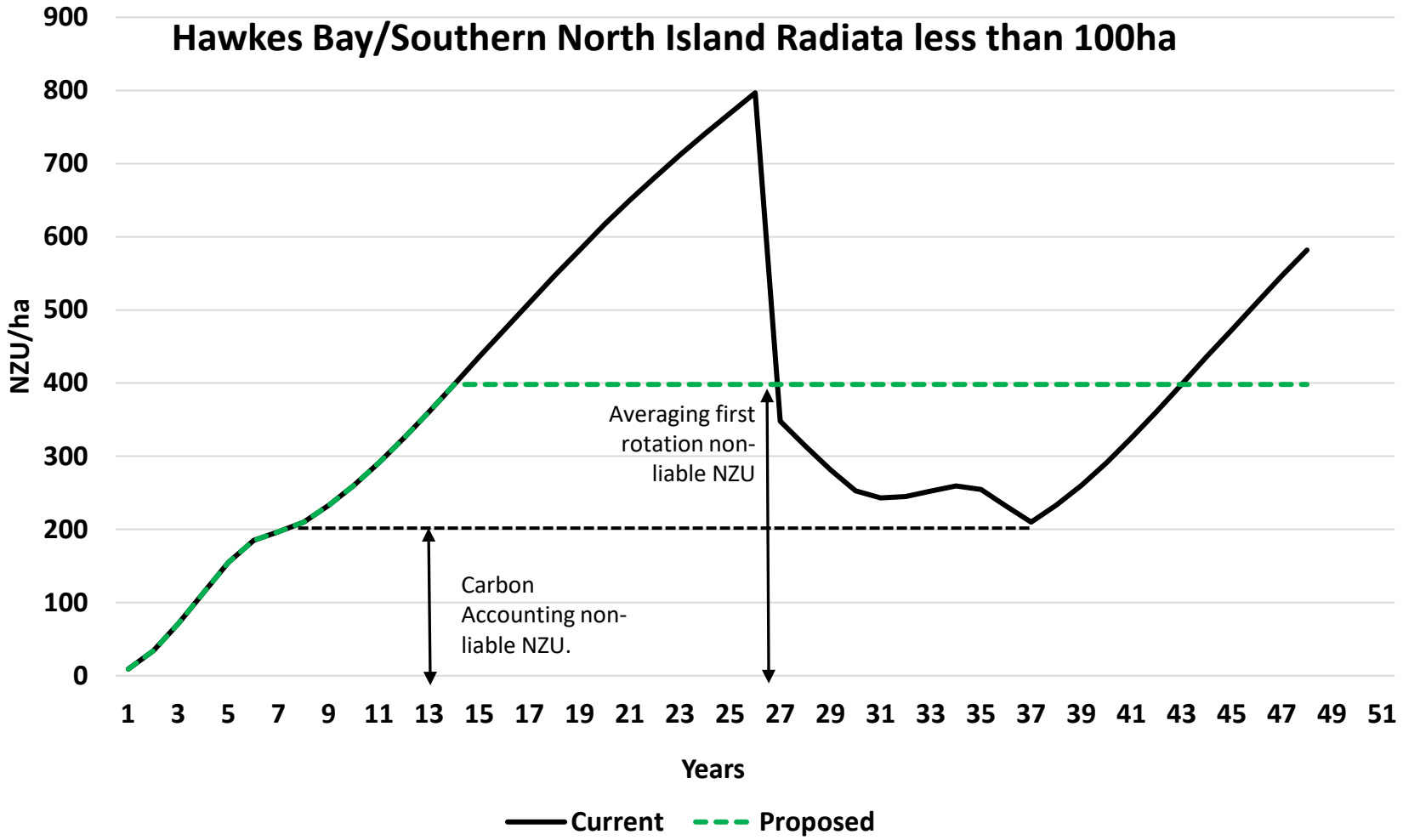
Carbon Accounting vs Averaging Radiata NZU Accumulation



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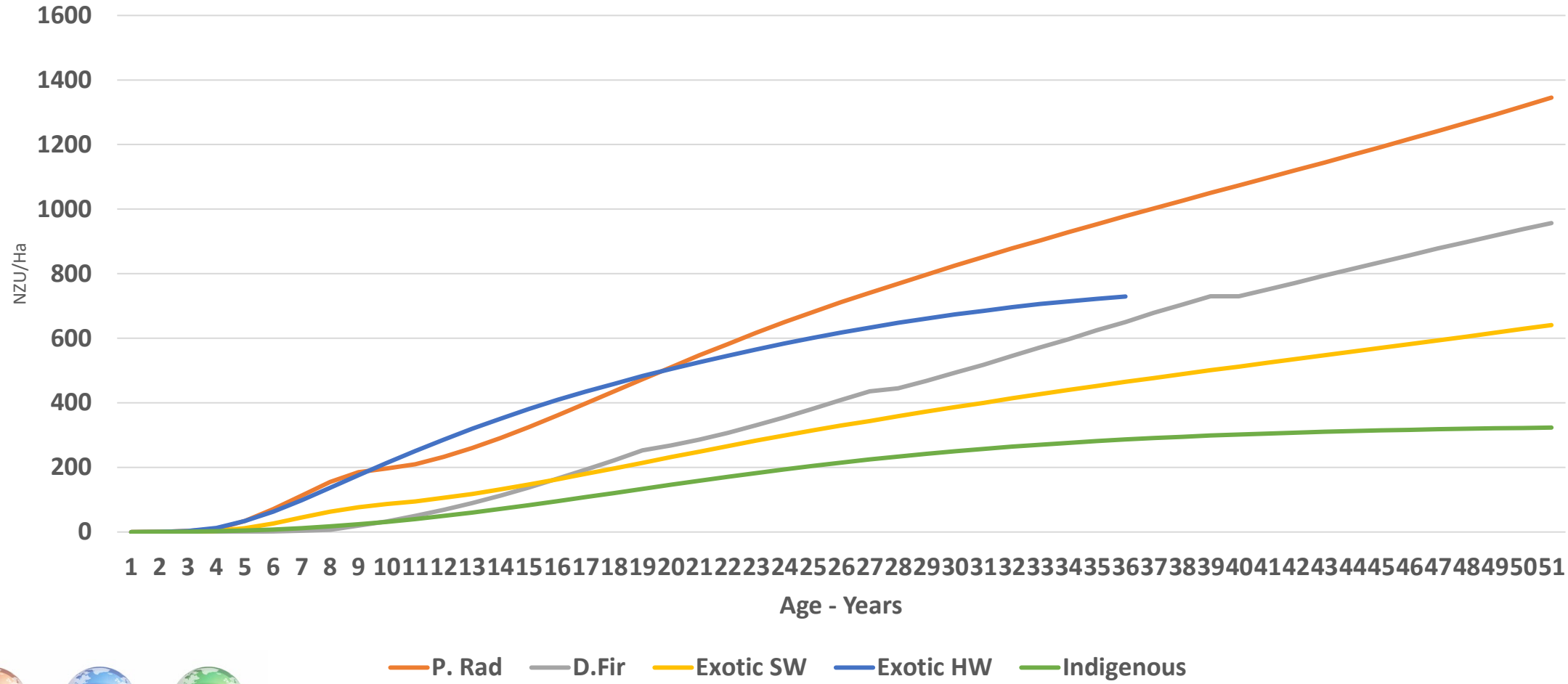
NOTE: Averaging levels of NZU accumulation have not been confirmed
Source: MPI Publications

Carbon Stock Growth by Species – Post89 Hawkes Bay/Southern North Island <100ha



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Temporary Adverse Events - 01 January 2023

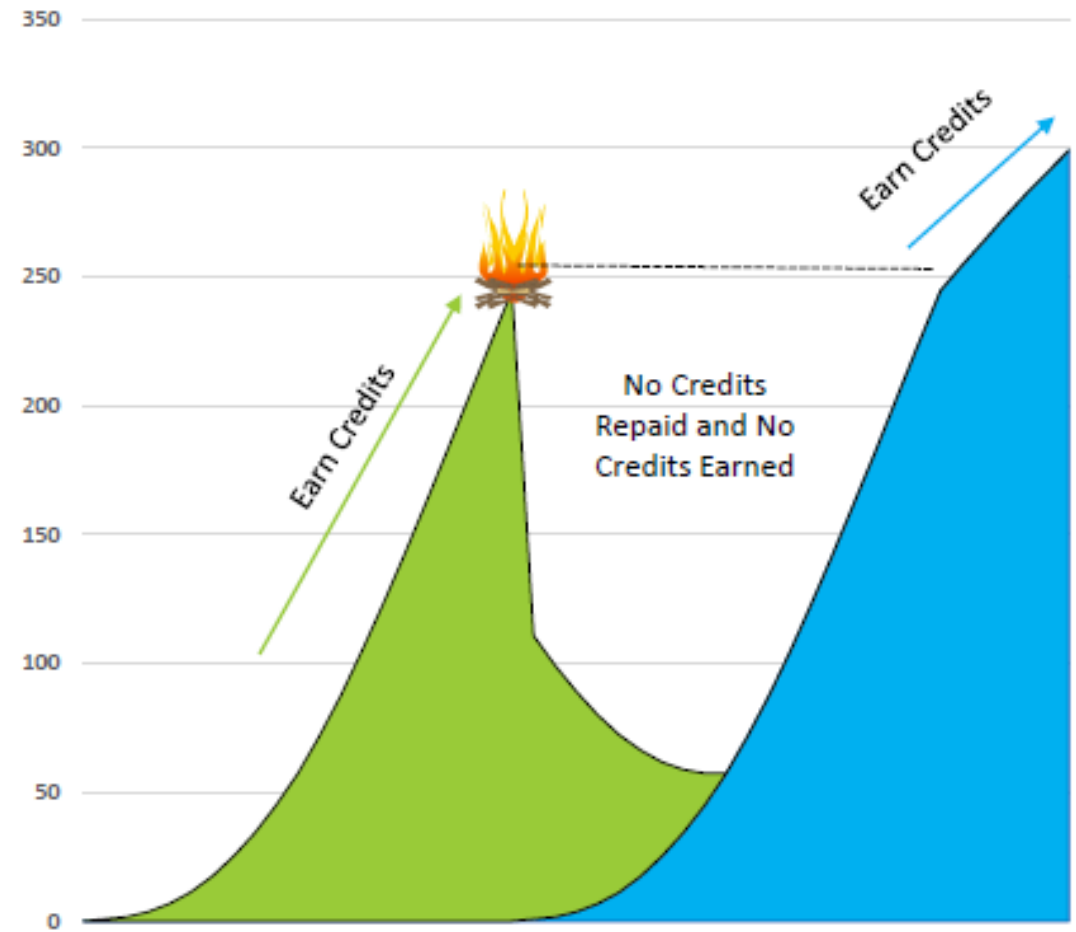
Current Rules: NZU liability for decrease in CO_2 stocks, e.g. fire.

- Liability capped at number of units issued.
- Carbon insurance available but expensive.

New Rules: No carbon liability if adverse event but:

- Forest must be re-established.
- No credits earned until the forest recovers to pre-adverse event carbon stocks.

- Carbon loss insurance not as important.
- May want future carbon insurance.
- Will Apply to both Carbon Stock Change and Averaging.



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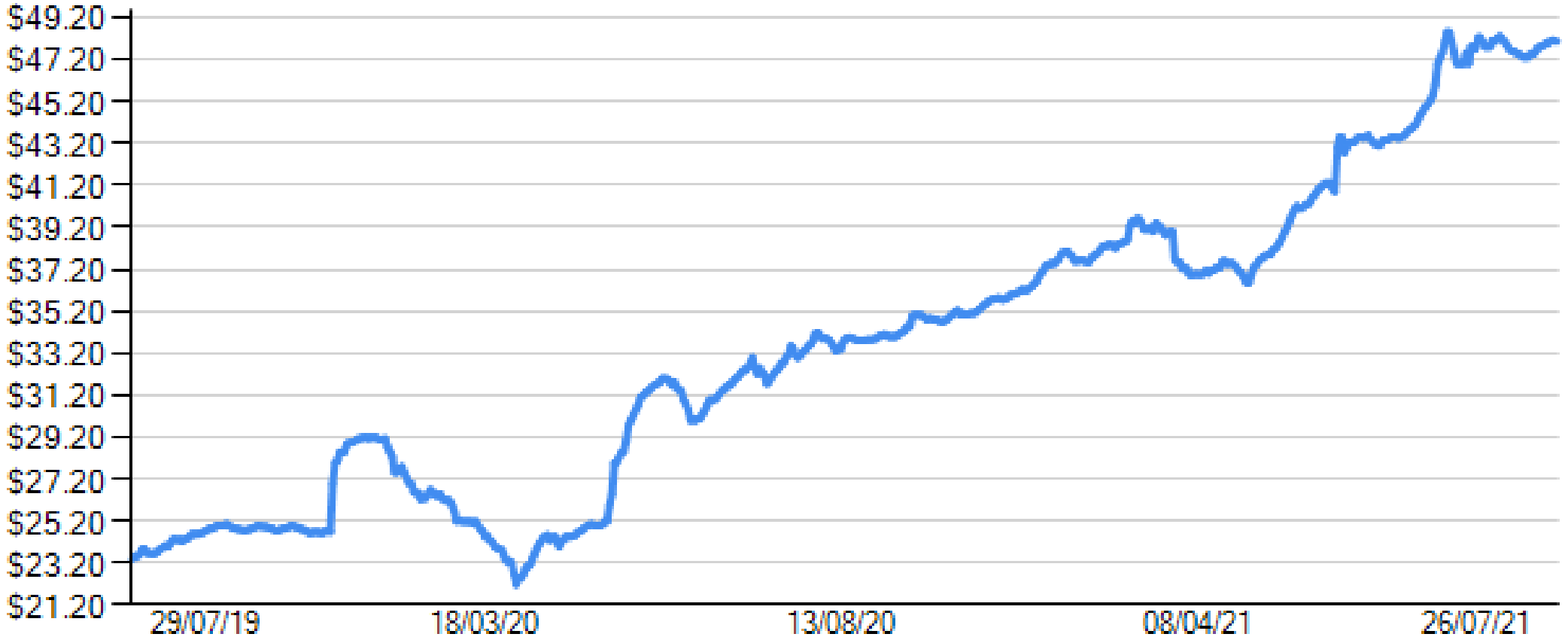
NZU Price Over Time



Source: www.commtrade.co.nz

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Carbon Pricing Update - The Future?

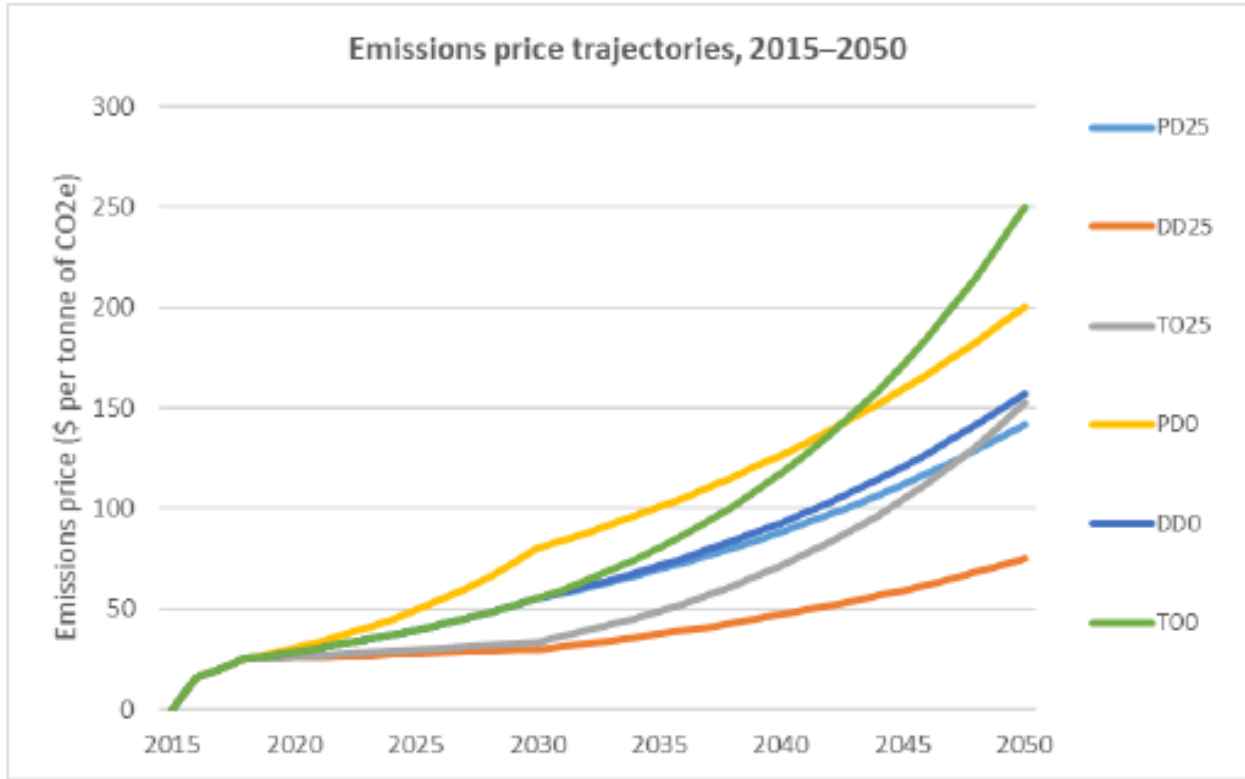
Productivity Commission models $75 - $250 by 2050 to meet Paris Target.

Climate Commission recommends auction CCR (currently $50) should

- Increase to $70 ASAP
- Reach $140 by 2030

High prices likely there are many uncertainties:

- Auctioning?
- International Units?
- Recession
- Future Governments
- Rule change
- Technology improvements



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

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NZU Price Forecast Key

Pathway	Assumed emissions price set for 2030	Reason for 2030 emissions price	Model-generated emissions price in 2050
PD–25	$55	Reflects strong early policy action given expectation of slow technological change	$142
DD–25	$30	Lower price relying on fast technological change	$75
SD–25	$30	Same as DD–25	$152
PD–0	$80	Higher price needed sooner to achieve more ambitious 2050 target	$200
DD–0	$55	Higher price needed sooner to achieve more ambitious 2050 target, but not as high as PD–0 because of anticipated help from technology	$157
SD–0	$55	Same as DD–0	$250

Source: Concept Consulting et al. (2018a).

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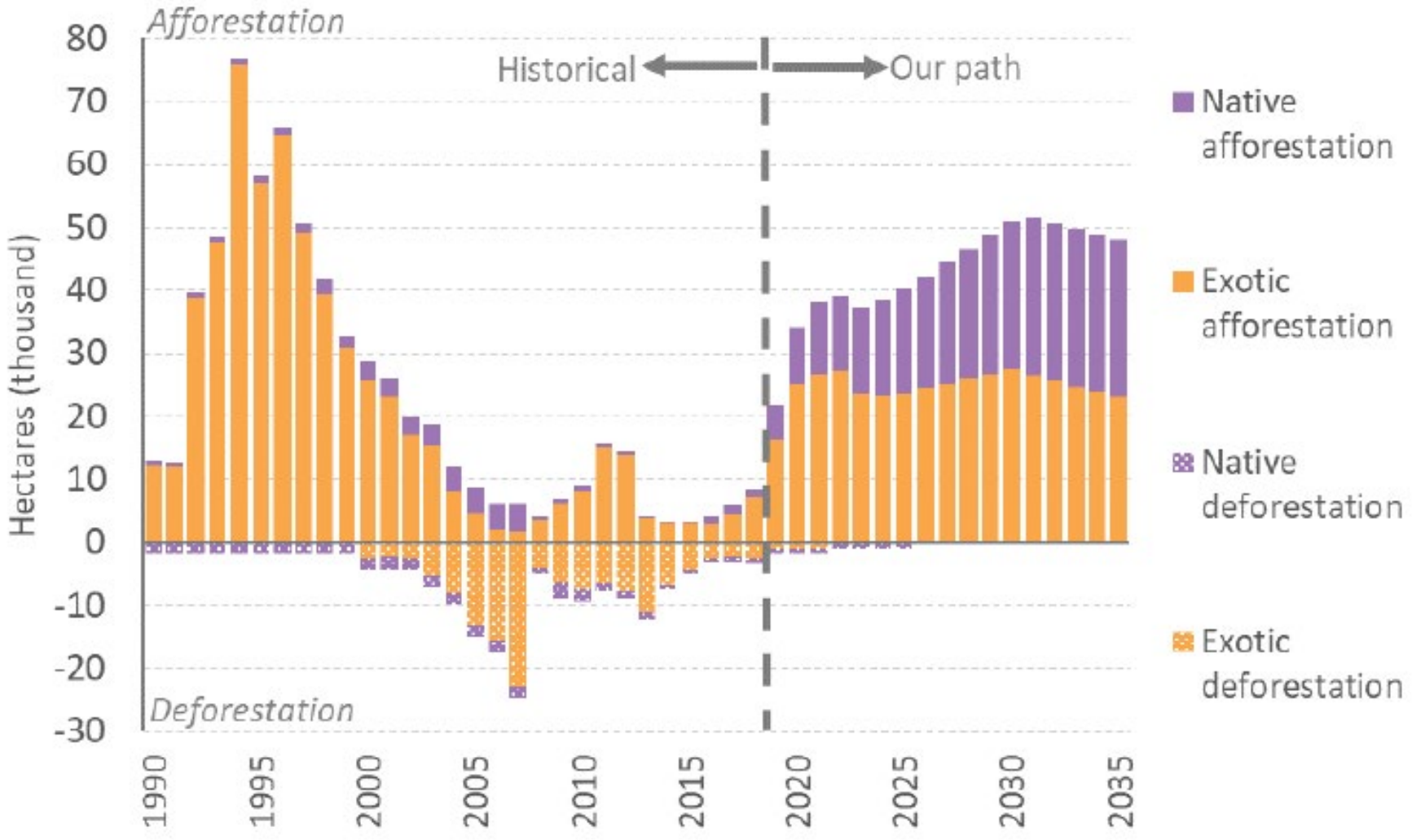
CCC Afforestation & Deforestation by Year



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Source: Climate Change Commission Draft Advice for Consultation, Figure 3.18, Page 68

Average Carbon Returns per Hectare @ NZU $48

All carbon based on MPI lookup tables for Hawkes Bay/Southern North Island
Forests less than 100ha

Species	Registration	Years	NZU Total/ha	Av NZU/ha/Yr	Av $/ha/Yr
Radiata Pine	Averaging	16	398	24.9	$1,195
Radiata Pine	Carbon Accounting*	50	1,345	26.9	$1,291
Douglas Fir	Carbon Accounting*	50	957	19.1	$916
Oth Exotic Softwoods	Carbon Accounting*	50	641	12.8	$614
Oth Exotic Hardwoods	Carbon Accounting*	35	729	20.8	$998
Indigenous	Carbon Accounting*	50	323	6.5	$312

- *Look up tables only go to 50 years for species groups other than Hardwoods which is 35 years.
- MPI is reviewing the Lookup Tables, particularly Exotic Hardwoods. **Numbers may change**
- Carbon Accounting Registration numbers assumes NO HARVESTING

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Common ETS Mistakes

- Forest owner always has 25-30% free/non-liable carbon
- No one will catch me if I de-forest some areas as nowhere near a road
- I made an honest mistake so MPI won't fine me
- My Post-89 forest wasn't registered for the first rotation so I will claim the carbon in the second rotation
- At some stage I will plant another area to offset the area I cut down and converted to pasture

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Combining Forestry with Farming

- Identify marginal land, determine suitable forest
- Area: small areas = comparatively large fencing cost
- How will harvesting areas affect farming operations?
- Engage advice on harvestability – hauler, groundbased
- Managing cashflow of forest management
- Identify possible carbon benefits

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Estimated Radiata Block Costs/Returns - Simple

		$/ha	Year
Costs	Planting	$1,700	0
	Pruning	$3,300	4, 6, 8
	Thinning	$1,200	8, 10
	Rates/Manage	$945	0-27
	Total Costs:	**$6,200**	
Revenues	Carbon	$19,104	0-16
	Harvest Net	$30,000	27
	Total Revenue:	**$49,104**	

Net Revenue: $42,904/ha
Annual Net revenue: $1,600/ha

- Costs assume clear land, standard forest management
- Assumed land is ETS compliant
- With ETS is cumulative cashflow neutral at age 5
- Harvest net is an average return for Whanganui/Taranaki region
- Assumed 27 year rotation
- Carbon on first rotation ONLY
- Excludes cost of capital, land
- Carbon at $48/NZU

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Estimated Radiata Block Costs/Returns - Complex

Revenue Over Rotation Incl Land:	$51,604 per ha
Expences Over Rotation Incl Land:	$8,203 per ha
NPV:	**$14,013 per ha**
IRR:	**25.6%**

NPV Rate:	5.0%
Carbon Price $/NZU:	**$48.00**
Average Registered Area ha:	**60**

Years Until Harvest	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Year	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	
NZU/ha	0	0.5	2.5	6.0	25.0	37.0	42.0	42.0	30.0	12.0	13.0	23.0	27.0	31.0	34.0	36.0	37.0	38.0	37.0	37.0	37.0	35.0	35.0	33.0	31.0	31.0	29.0	28.0	
Cumulative NZU/ha	0	0.5	3	9	34	71	113	155	185	197	210	233	260	291	325	361	398	436	473	510	547	582	617	650	681	712	741	769	
Revenue $/ha																													
Carbon Revenue	$0	$24	$120	$288	$1,200	$1,776	$2,016	$2,016	$1,440	$576	$624	$1,104	$1,296	$1,488	$1,632	$1,728	$1,776	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$19,104
Harvesting Revenue																												$30,000	$30,000
Land Value:	0																											**$2,500**	$2,500
Total Revenue/ha:	**$0**	**$24**	**$120**	**$288**	**$1,200**	**$1,776**	**$2,016**	**$2,016**	**$1,440**	**$576**	**$624**	**$1,104**	**$1,296**	**$1,488**	**$1,632**	**$1,728**	**$1,776**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$32,500**	**$51,604**
Expenditure $/ha																													
Land Cost:	$0																												$0
ETS Fees		$50	$7	$7	$167	$7	$7	$7	$7	$167	$7	$7	$7	$7	$167	$7	$7	$7	$7	$167	$7	$7	$7	$7	$167	$7	$7	$7	$1,023
Planting/Release	$1,700																												$1,700
Pruning					$1,100		$1,100		$1,100																				$3,300
Thinning									$600			$600																	$1,200
Rates/Fences	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$35	$980
Total Expenditure/ha:	**$1,735**	**$85**	**$42**	**$42**	**$1,302**	**$42**	**$1,142**	**$42**	**$1,742**	**$202**	**$42**	**$642**	**$42**	**$42**	**$202**	**$42**	**$42**	**$42**	**$42**	**$202**	**$42**	**$42**	**$42**	**$42**	**$202**	**$42**	**$42**	**$42**	**$8,203**
Annual Cashflow $/ha:	**-$1,735**	**-$61**	**$78**	**$246**	**-$102**	**$1,734**	**$874**	**$1,974**	**-$302**	**$374**	**$582**	**$462**	**$1,254**	**$1,446**	**$1,430**	**$1,686**	**$1,734**	**-$42**	**-$42**	**-$202**	**-$42**	**-$42**	**-$42**	**-$42**	**-$202**	**-$42**	**-$42**	**$32,458**	**$43,401**
Cumulative Cashflow $/ha:	**-$1,735**	**-$1,796**	**-$1,718**	**-$1,471**	**-$1,573**	**$161**	**$1,036**	**$3,010**	**$2,708**	**$3,083**	**$3,665**	**$4,127**	**$5,382**	**$6,828**	**$8,258**	**$9,945**	**$11,679**	**$11,637**	**$11,596**	**$11,394**	**$11,352**	**$11,311**	**$11,269**	**$11,227**	**$11,026**	**$10,984**	**$10,942**	**$43,484**	
Annual Cashflow 100ha:	**-$104,100**	**-$3,660**	**$4,700**	**$14,780**	**-$6,100**	**$104,060**	**$52,460**	**$118,460**	**-$18,100**	**$22,460**	**$34,940**	**$27,740**	**$75,260**	**$86,780**	**$85,820**	**$101,180**	**$104,060**	**-$2,500**	**-$2,500**	**-$12,100**	**-$2,500**	**-$2,500**	**-$2,500**	**-$2,500**	**-$12,100**	**-$2,500**	**-$2,500**	**$1,947,500**	
Cumulative Cashflow 100ha:	**-$104,100**	**-$107,760**	**-$103,060**	**-$88,280**	**-$94,380**	**$9,680**	**$62,140**	**$180,600**	**$162,500**	**$184,960**	**$219,900**	**$247,640**	**$322,900**	**$409,680**	**$495,500**	**$596,680**	**$700,740**	**$698,240**	**$695,740**	**$683,640**	**$681,140**	**$678,640**	**$676,140**	**$673,640**	**$661,540**	**$659,040**	**$656,540**	**$2,609,040**	

Whilst Transglobal Connections Ltd (TGC) has endeavored to use realistic inputs there is no guarantee or promise that the actual yields, costs and revenues will be the same as those shown in this financial estimate. The results of this financial estimate are based on prevailing information at the time of this report and no responsibility is taken for future changes that may or may not change the value over time.

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Market Opportunities

- Minor species require detailed planning of marketing
- Strong domestic market for pruned logs, fluctuating export market for unpruned logs
- Current government has significant focus on domestic processing – majority foreign owned forests makes this difficult
- Exciting clearwood market (cut from pruned logs) in Europe
- Volatile and unknown future for log exports to China

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