Australian National University

Native forests for bioenergy or biodiversity?

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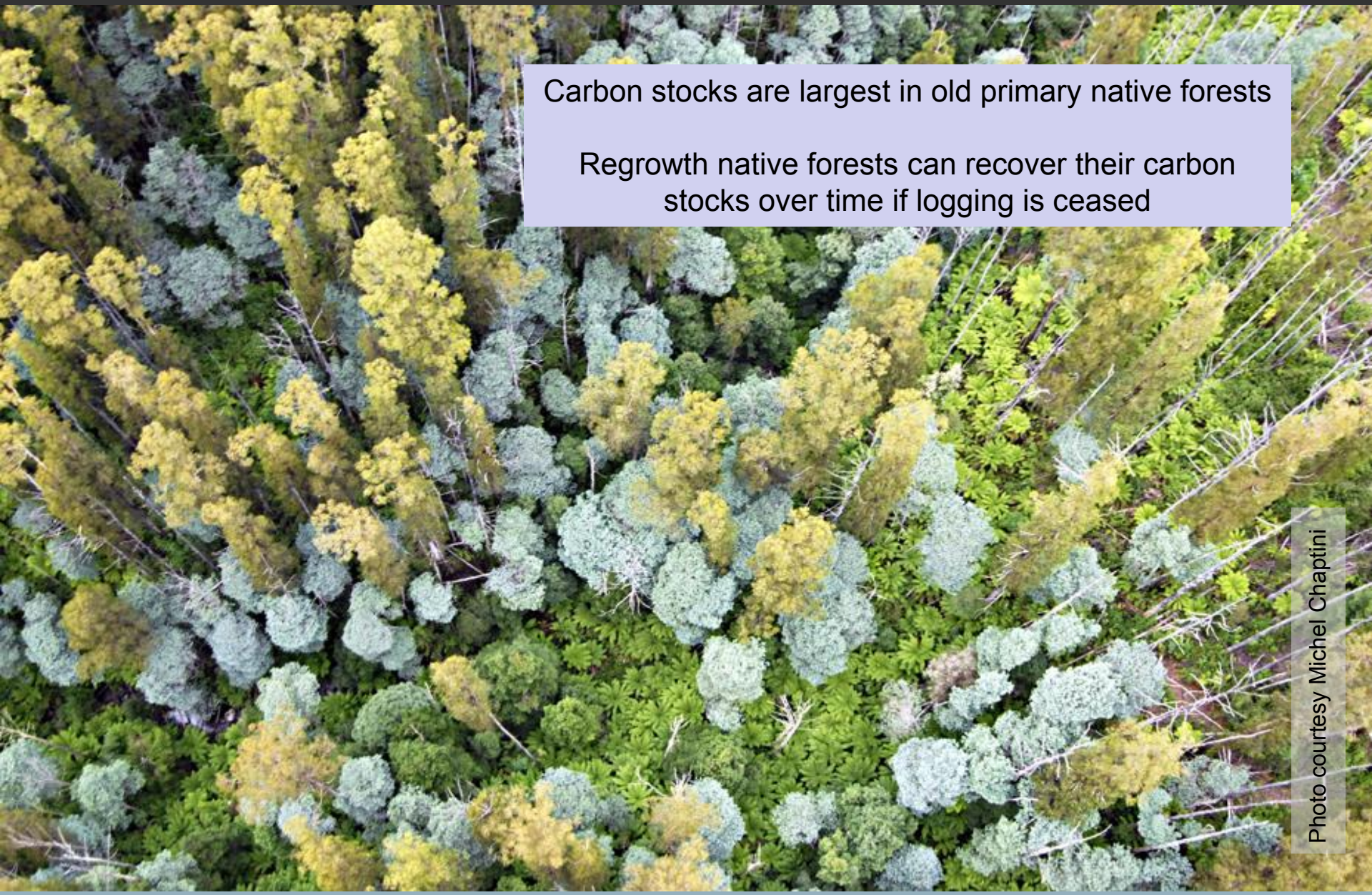
Maintaining and restoring biodiversity in native forests promotes their resilience to human pressures

Photo Judith Ajani



Carbon stocks are largest in old primary native forests

Regrowth native forests can recover their carbon stocks over time if logging is ceased

Photo courtesy Michel Chaptini

Landscape traps compromise native forest carbon carrying capacity

Photo courtesy Judith Deland

Photo courtesy Judith Deland

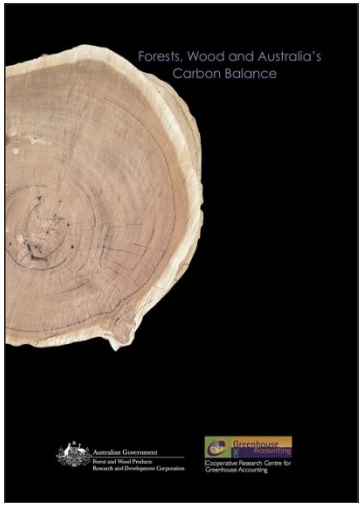
Old growth forests are in a state of dynamic equilibrium and continue to be a small net sink in taking up CO_2 from the atmosphere

Forestry industry argument

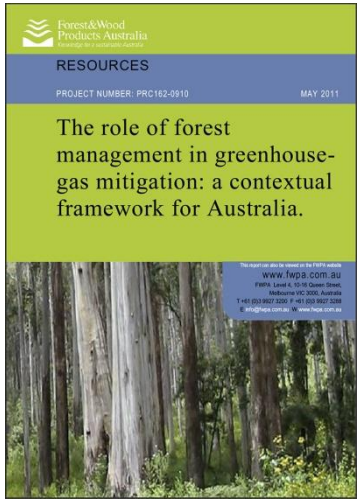
1. Carbon storage in native forest faces limits

2. Substituting wood for carbon intensive products and fossil fuels will reduce atmospheric CO_2 more than preserving forests

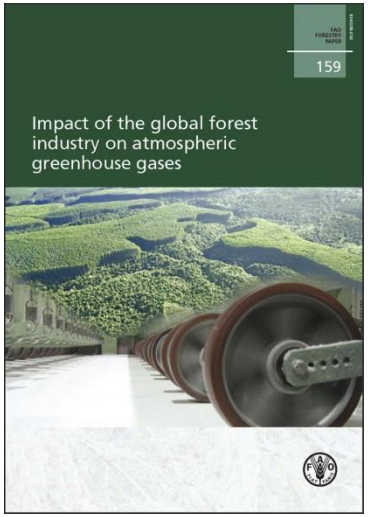
3. The best outcome for the atmosphere is to substitute fossil fuels with wood



Forest and Wood Products R & D Corporation and CRC for Greenhouse Accounting, 2006

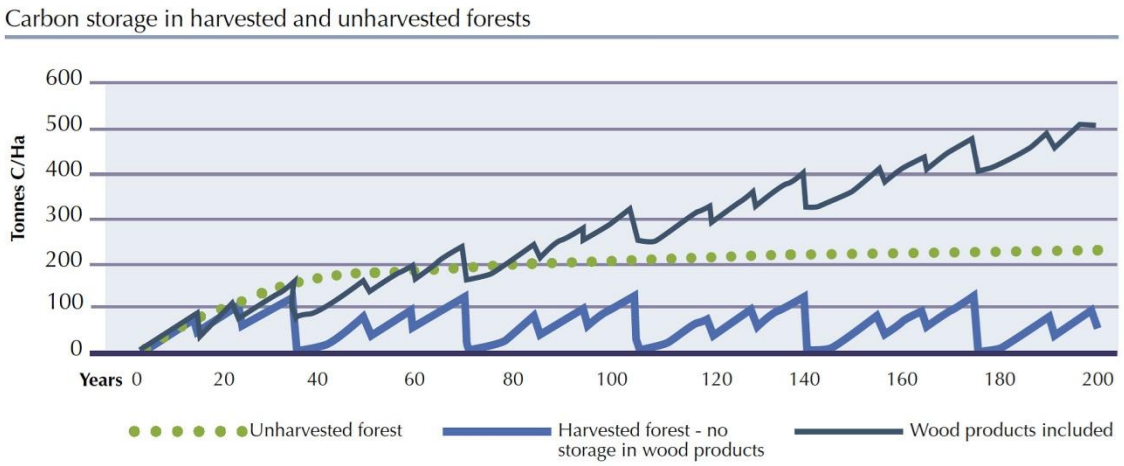


Martin Moroni 2011, report for Forest & Wood Products Australia

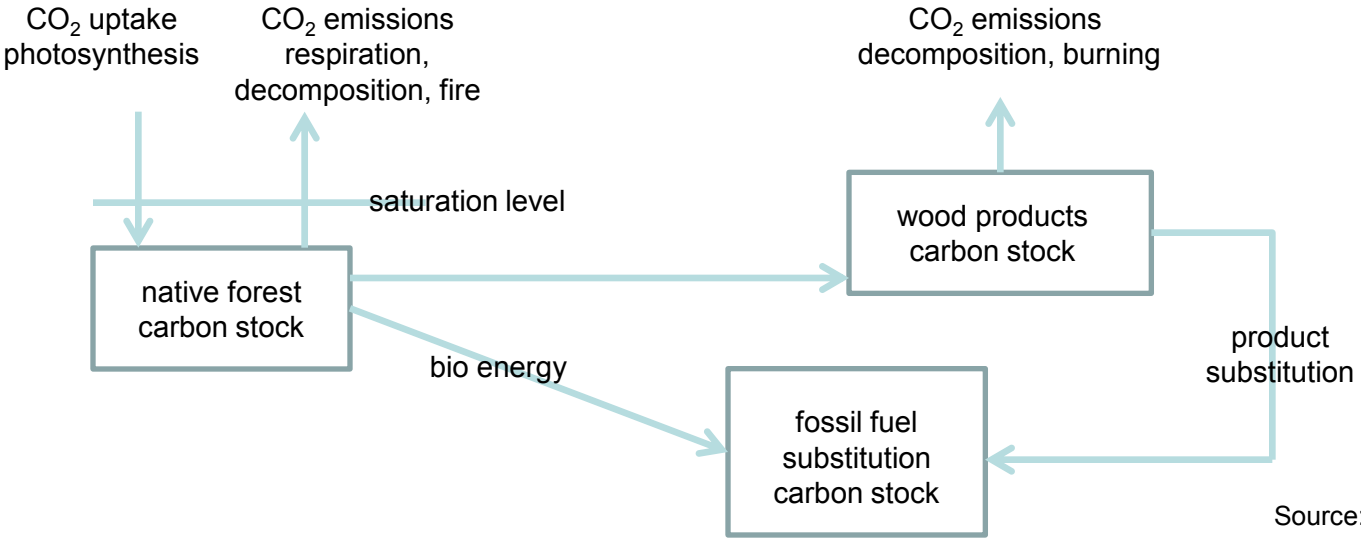


Rod Miner 2010, report published by FAO Forestry

Forestry industry conceptual framework



Forest and Wood Products R&D Corp and CRC for Greenhouse accounting, 2006, figure 10.

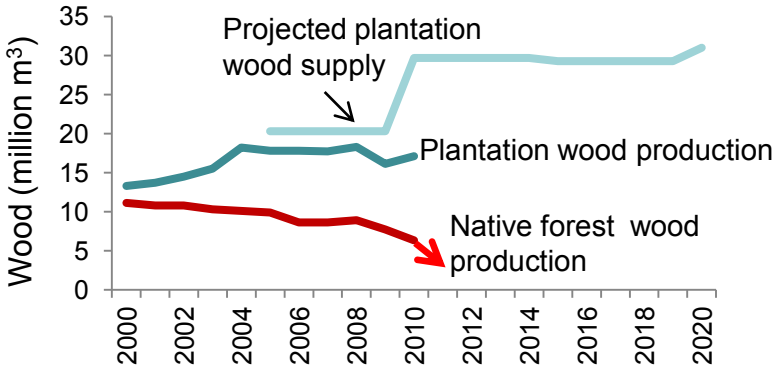


Source: Moroni, 2011 (slightly amended)

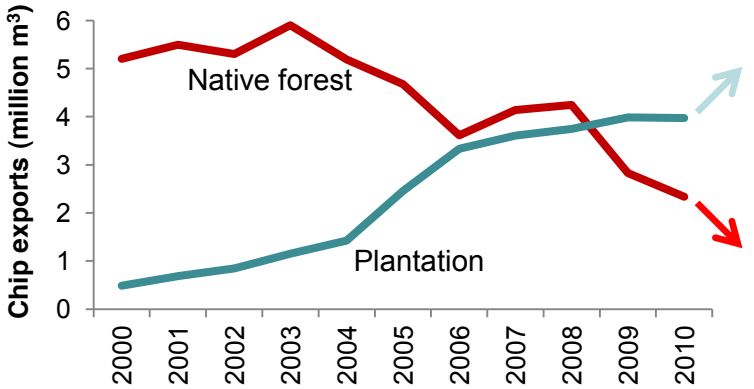
Year	Reference	Research question - finding
1976 - 1989	Dyson; Dyson & **Marland**; Marland	Emergency tree planting
1990	Harmon *et al*.	Time to recapture carbon after logging old growth forests
1992	**Marland** & Marland S	Model with wood substituting for fossil fuel claimed as a 'permanent' credit to forestry
1996	**Schlamadinger** & **Marland**	GORCAM with native forests included in the scenarios
1997	At least five papers	What's best for the climate? Answer: It depends …
	Marland & **Schlamadinger** in *Mitigation and Adaptation Strategies for Global Change*	'very difficult' to attribute all the fossil fuel carbon offsets to forestry 'challenging' to measure the amount of fossil fuel actually saved
	Marland, **Schlamadinger** & Leiby in *Critical Reviews in Environmental Science and Technology*	Likely that current emission reductions are more valued than future reductions - favours avoiding emissions by protecting carbon storage in forests
1999	**Schlamadinger** & **Marland** in *TELLUS*	Net emissions CAN continue for very long times perhaps centuries – even with full credit for fossil fuel saving and wood product storage

Australian native forestry industry situation & outlook

Wood production

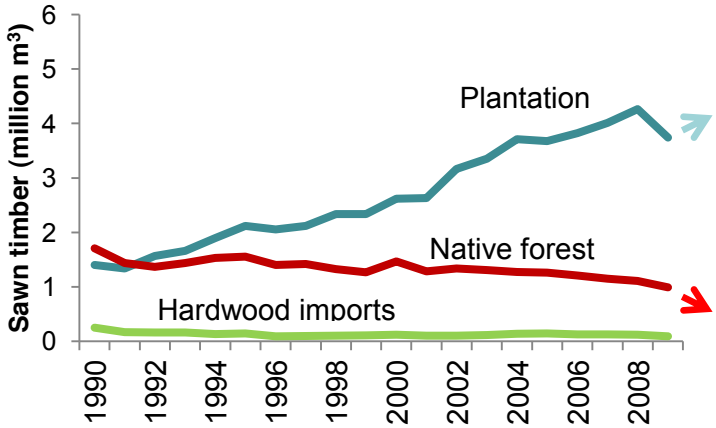


Hardwood chip exports



Sawn timber & wood panels production

Sawn timber production & hardwood imports



Data sources: ABARES *Australian Forest and Wood Product Statistics*; BRS *Australia's Plantation Log Supply 2005-2049*.

Carbon stock effects of native forest logging for sawn timber & bioenergy

SCENARIO

Native forest management regime

- 100 year rotation
- MAI = 2 m^3/ha/yr (Resource Assessment Commission)
- 35% sawlogs
- 2% poles, posts, sleepers
- All chiplogs and sawmill residues to bioenergy

Forest biomass and regrowth

- Grierson *et al*. 1992 (amended to 100 years) for native forest regrowth profile
- Root to shoot ratio: 0.25:1

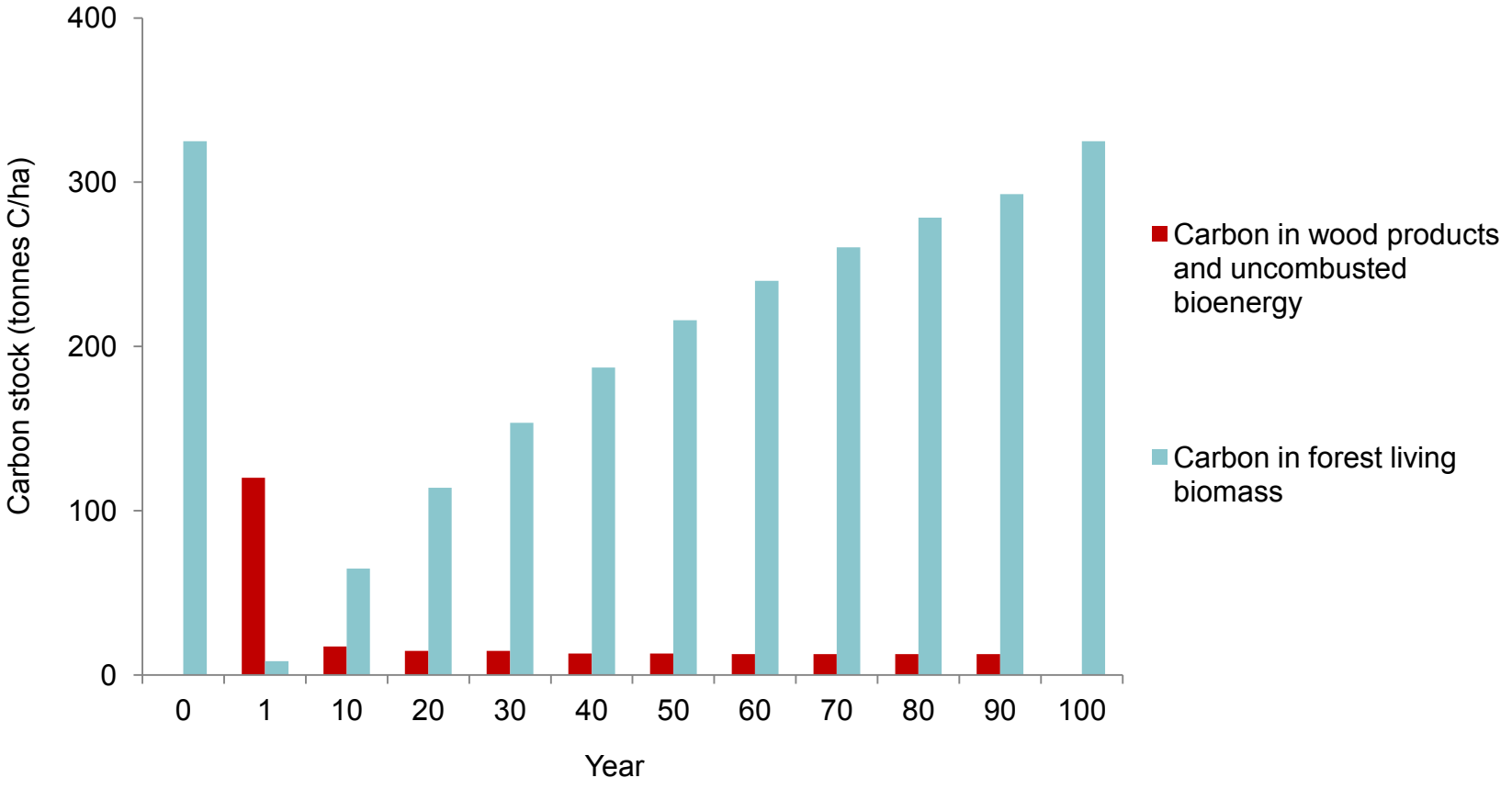
  ⇨ merchantable wood = 37% above and below ground living biomass at logging time

- Soil carbon and dead biomass excluded

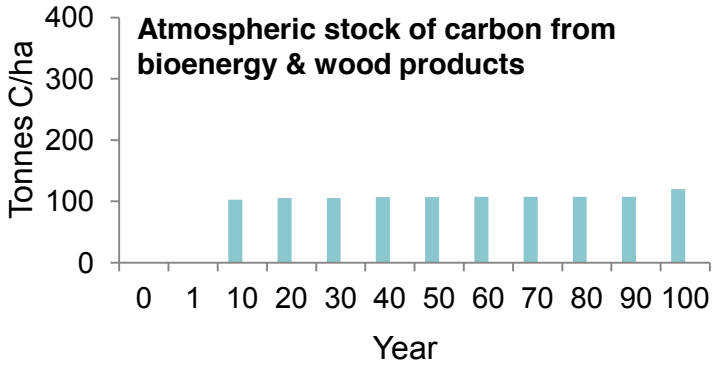
Wood product life

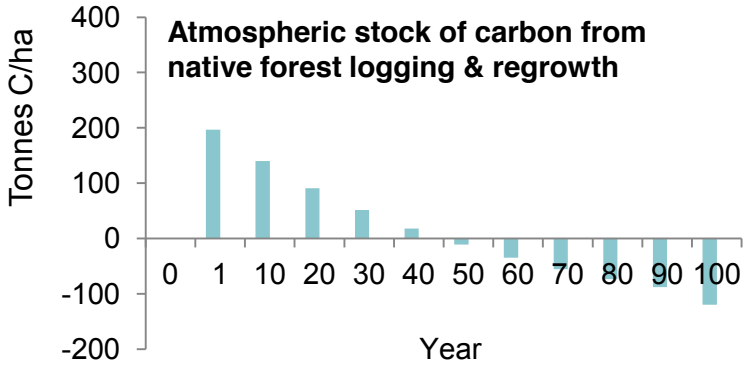
- Products and pools from Jaakko Poyry 1999, NCAS report No 8
- 85% of sawn timber goes to framing, boards, flooring and furniture and has 90 year life

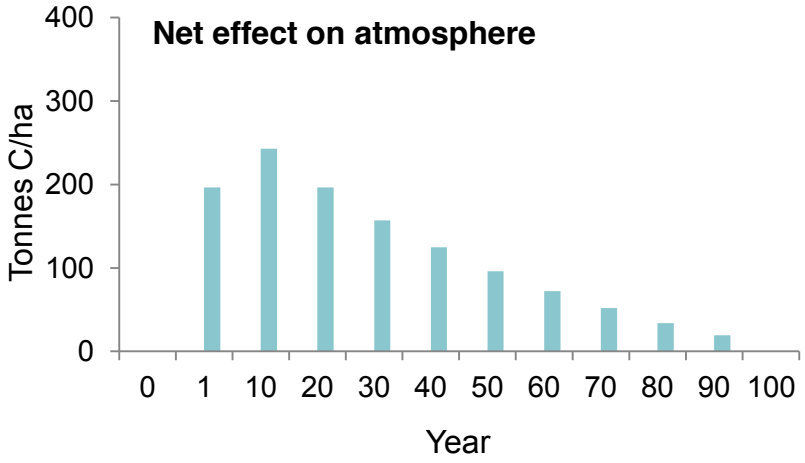
Native forest logging scenario: sawn timber with all chip logs and sawmill residues to bioenergy



What's happening in the atmosphere?







Native forest capacity to displace Australian coal based electricity

	Raw material 2009 (million tonnes)	Energy content factor (Gj/tonne)	Energy* (million Gj)
Black coal	56 (est)	27.0	1,512
Brown coal	68	10.2	694
Total coal	124		2,206
Green & air dried wood	6	10.4	62

62/2206 = 2.8%

* Energy content before transport and production losses. Setting amount of native forest wood used for bioenergy at total wood production in 2009. Energy content factors: Department of Climate Change and Energy Efficiency National Greenhouse Accounts Factors.

Conclusions

1. Logging a native forest stand today cannot be ‘carbon neutral’ over the critical period for climate change policy – the next 30 to 40 years.

2. Understanding stock changes over longer periods (through to 2050) is much more important than annual flow rates. The global atmospheric CO_2 stock in 2050 will determine climate impacts, not annual emission rates.

3. With native forest sawn timber a declining remnant and chip exports being rapidly displaced by Australia’s hardwood plantations, opening native forests to the bioenergy market will be ‘all pain for no gain’.

4. Serious data availability and quality problems should rule out native forests from inclusion in the carbon market.

5. Climate change policy should separate native forests from plantations because they are fundamentally different ecosystems with different carbon stories and also economic prospects.

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