Addendum to Submission to the Commonwealth Government on the Carbon Pollution Reduction Scheme Green Paper

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September 2008

Our first submission found that plantation owners can be expected to forgo wood production and preference carbon production at relatively low CO_2 prices. Claims have been made that carbon stored in wood products invalidates this finding because the capacity for plantations to mitigate climate change is enhanced by jointly providing wood and carbon benefits (NAFI 2008; Hansard & de Jongh 2008). Whether this is even an issue depends on the accounting rules ultimately adopted by the IPCC. At this stage, carbon storage in wood products is not counted under the Kyoto Protocol or proposed in the Green Paper to be counted. Our previous findings stand if this remains the case.

This addendum to our first submission presents a refinement to our model to test the effect of carbon stored in wood products, should that be included in the future under IPCC rules. We find that storing carbon in wood products does not invalidate our previous finding.

The addendum also incorporates the CO_2 prices presented in the Garnaut Review's *Supplementary Draft Report, Targets and Trajectories*.

Model refinement

We introduce a new factor:

W - carbon stored in wood products as a percentage of carbon in merchantable wood,

and replace the previous equation $P_c = P_w S_w / C_w$, with:

$P_c = P_w S_w / (C_w (1 - W S_w))$.

We re-ran the model allowing for a range in values for P_w, S_w and W.

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The \$20/m^3 to \$30/m^3 range in P_w (wood price) is a realistic range for hardwood plantation pulplog prices. The \$30/m^3 to \$50/m^3 range in P_w (wood price) is a generous range for the higher average price typical of most softwood plantation management regimes with sawlogs of varying qualities (accounting for around 60 per cent of wood yield) and pulplogs (accounting for 40 per cent of wood yield). We re-ran the model with the full range of values for the new factor, W (carbon stored in wood products as a percentage of carbon in merchantable wood).

For Australia's Kyoto compliant hardwood plantations, a value of 0% for W is appropriate: most were planted for chip exporting and, if IPCC rules permit storage in wood products to be counted, the embodied carbon becomes the property of the importer or importing country. If processed in Australia, they would largely produce short-term products with low values for W.

For Australia's softwood plantation estate, geared largely to the domestic market, a value for W of less than 50% is appropriate given the proportion of the national softwood log cut exported unprocessed or as processed wood products (ABARE 2008; Ajani 2008) and the short product life for paper. For clarity, we categorise all domestically produced and consumed softwood sawn timber and wood panels as having lives the duration of a 30 year rotation and present ranges for W up to an unlikely 100%.

The CO_2 price required for plantation owners to receive an equal revenue, at nominal harvest time, from carbon storage rather than logging the plantation for wood (including the value of carbon stored in wood products) for the range of values for P_w, S_w and W is as follows:[3]

[3] When $W = 0\%$, the CO_2 equalising prices differ slightly from our first submission due to calculations having a higher number of decimal places.

P_w – the stumpage price of logs = \$20/m^3 (average over the rotation)

W – carbon stored in wood products as a percentage of carbon in merchantable wood	S_w – carbon in merchantable wood as a percentage of total plantation biomass carbon		
	40%	50%	60%
0%	\$7.53	\$9.41	\$11.29
10%	\$7.84	\$9.91	\$12.01
20%	\$8.18	\$10.46	\$12.83
30%	\$8.56	\$11.07	\$13.77
40%	\$8.96	\$11.76	\$14.86
50%	\$9.41	\$12.55	\$16.13
60%	\$9.91	\$13.44	\$17.65
70%	\$10.46	\$14.48	\$19.47
80%	\$11.07	\$15.68	\$21.72
90%	\$11.76	\$17.11	\$24.55
100%	\$12.55	\$18.82	\$28.23

P_w – the stumpage price of logs = \$30/m^3 (average over the rotation)

W – carbon stored in wood products as a percentage of carbon in merchantable wood	S_w – carbon in merchantable wood as a percentage of total plantation biomass carbon		
	40%	50%	60%
0%	\$11.29	\$14.12	\$16.94
10%	\$11.76	\$14.86	\$18.02
20%	\$12.27	\$15.68	\$19.25
30%	\$12.83	\$16.61	\$20.66
40%	\$13.44	\$17.65	\$22.29
50%	\$14.12	\$18.82	\$24.20
60%	\$14.86	\$20.17	\$26.47
70%	\$15.68	\$21.72	\$29.21
80%	\$16.61	\$23.53	\$32.58
90%	\$17.65	\$25.67	\$36.82
100%	\$18.82	\$28.23	\$42.35

P_w – the stumpage price of logs = \$40/m^3 (average over the rotation)

W – carbon stored in wood products as a percentage of carbon in merchantable wood	S_w – carbon in merchantable wood as a percentage of total plantation biomass carbon		
	40%	50%	60%
0%	\$15.06	\$18.82	\$22.59
10%	\$15.68	\$19.81	\$24.03
20%	\$16.37	\$20.91	\$25.67
30%	\$17.11	\$22.14	\$27.54
40%	\$17.93	\$23.53	\$29.72
50%	\$18.82	\$25.10	\$32.27
60%	\$19.81	\$26.89	\$35.29
70%	\$20.91	\$28.96	\$38.94
80%	\$22.14	\$31.37	\$43.43
90%	\$23.53	\$34.22	\$49.10
100%	\$25.10	\$37.64	\$56.46

P_w – the stumpage price of logs = \$50/m^3 (average over the rotation)

W – carbon stored in wood products as a percentage of carbon in merchantable wood	S_w – carbon in merchantable wood as a percentage of total plantation biomass carbon		
	40%	50%	60%
0%	\$18.82	\$23.53	\$28.23
10%	\$19.61	\$24.77	\$30.03
20%	\$20.46	\$26.14	\$32.08
30%	\$21.39	\$27.68	\$34.43
40%	\$22.41	\$29.41	\$37.15
50%	\$23.53	\$31.37	\$40.33
60%	\$24.77	\$33.61	\$44.11
70%	\$26.14	\$36.20	\$48.68
80%	\$27.68	\$39.21	\$54.29
90%	\$29.41	\$42.78	\$61.37
100%	\$31.37	\$47.05	\$70.58

Findings

1. Hardwood pulplog plantations, which dominate Australia's Kyoto compliant plantation estate, are geared for the export chip market. Therefore $W = 0\%$ and the finding presented in our first submission remains unchanged: hardwood plantation owners can be expected to forgo harvesting revenue and preference the carbon market well before carbon (CO_2) prices reach \$20/tonne, the Garnaut Review's recommended 2010 commencement price for emissions permits.[4]

2. For a Kyoto compliant softwood plantation with a typical sawlog dominant management regime and log prices (P_w) averaging \$30/m^3, plantation owners will receive more revenue by diverting plantations from wood production to carbon production under the government's proposed emissions trading system with CO_2 prices at \$20/tonne, unless carbon storage in wood products exceeds 50% of the merchantable wood volume. (Carbon storage in wood products is unlikely to exceed 50% of the merchantable wood volume over a rotation time period.) If CO_2 prices reach \$30/tonne in today's dollars (by 2020 using Garnaut's price trajectory), it is unlikely technically for softwood plantation growers to receive more revenue from wood production (including carbon stored in wood products) than from the carbon market.

3. The finding for softwood plantations with an average log price of \$40/m^3 are not substantially different to the \$30/m^3 scenario. At Garnaut's starting CO_2 price of \$20/tonne, plantation owners would receive more revenue from wood production if carbon storage in wood products accounts for up to 20% of the merchantable wood volume. But at CO_2 prices of \$30/tonne, technically possible outcomes where softwood plantation growers receive more revenue from wood production (including carbon stored in wood products) than from the carbon market become unlikely.

4. We include a high average softwood plantation log price of \$50/m^3. If log prices rise to such levels in the near future, plantation owners will receive more revenue from wood production irrespective of the carbon stored in wood products. This appears to be a temporary situation. If CO_2 prices reach \$30/tonne by around 2020, plantation owners will need carbon stored in wood products at 40% to 50% for wood revenues to match carbon revenues.

[4] If processed in Australia, at a high log price of \$30 per tonne, values of W have to approach 50% before wood growers would forego carbon revenue.

Additional comments

In preparing this addendum, we make the following additional comments:

1. Developing reliable systems for measuring, tracking and reporting the life cycle of wood products and their carbon storage profiles is arduous and time-consuming work. The costs, which should be borne by industry, may well be substantial relative to the yet unproven commercial benefits for the Australian plantation processing industry from covering plantations in the proposed emissions trading scheme.

2. Who becomes the owner of carbon stored in imported wood products is unresolved. If grower interests dominate, we can expect forestry industry lobbyists to call for the stored carbon in imported products to be included the wood growing basket of credits. This runs counter to the interests of the proposed emissions trading scheme with its objective of price signals being kept as close as practically possible to the final consumer.

3. The stock of carbon stored in a nation's consumed wood products can only increase over time if consumption increases and/or long-life wood products take a greater share in Australia's wood products consumption. For many decades now, most projections of Australia's wood products consumption have not been realised. Sawn timber and wood panels are no longer high growth industries in developed countries, including Australia. With the time value of money, a feature of the wood products market is the shift from sawn timber to wood-based panels, which works to reduce the life of Australia's wood products basket.

References

ABARE (2008), *Australian Forest Products Statistics September and December Quarters 2007*.

Ajani J. (2008), 'Australian production of wood and wood products in 2006/07 disaggregated by wood source', unpublished paper, Fenner School of Environment and Society, The Australian National University.

Garnaut Review (2008), *Supplementary Draft Report, Targets and Trajectories*.

Hansard A. & D.R.P. de Jongh (National Association of Forest Industries) (2008), Evidence to Senate Select Committee on Rural & Regional Affairs & Transport, Ref: Climate change and the Australian agriculture sector, 30 June 2008.

NAFI (2008), Submission to Garnaut Climate Change Review, Land Use – Agriculture and Forestry.