

Tasmanian Forest Agreement 2012

Who is the winner?

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Andrew Macintosh

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LPO Box 5096
University of Canberra, Bruce ACT 2617
Tel: (02) 6206 8700 Fax: (02) 6206 8708
Email: mail@tai.org.au
Website: www.tai.org.au

Introduction

On 22 November 2012, the timber industry and environmental non-government organisations released the Tasmanian Forest Agreement 2012 (TFA). The agreement includes a number of components, the most significant of which are the support for the creation of an additional 504,012 ha of forest reserves, a reduction in the high quality sawlog guarantee from 300,000 m³ yr⁻¹ to 137,000 m³ yr⁻¹, and the third restructuring package for the Tasmanian forestry industry in 15 years.

If the terms of the TFA are agreed and implemented, the Tasmanian Government is expected to receive around \$300 million from the Commonwealth to compensate displaced forest workers, payout forest contracts, subsidise restructured operations, and help establish and manage the new reserves. The allocation from the Commonwealth is almost certain to include the remainder of the funds previously earmarked under the Tasmanian Forests Intergovernmental Agreement (IGA) (i.e. around \$130 million of the original \$261.5 million). The Tasmanian Premier, Lara Giddings, has also indicated that the Tasmanian Government has commenced negotiations with the Commonwealth for an unspecified additional amount.¹

Despite the chequered history of forest deals in Tasmania, the TFA was portrayed by its supporters as presenting a unique opportunity to overcome the divisiveness and uncertainty that have surrounded the industry and hamstrung the Tasmanian economy. Writing in *The Weekend Australian*, Lyndon Schneiders of The Wilderness Society encapsulated this argument:

More than the forests or the timber industry, it is the Tasmanian community and Tasmanian economy that most desperately needed the forest peace agreement ... [for] it is the Tasmanian community, split asunder for years by the battle for forests, that has been affected most by this debate. The scars are deep and the uncertainty and constant political heat around this issue have created a serious dent in investor confidence in the state and cast a shadow over the prospects for sustainable economy growth and opportunity. It is for these reasons, not just for the forests or the workers, that the agreement needs political support to give Tasmania a new start.²

Echoing these sentiments, the Tasmanian Premier described the TFA as ‘a historic moment’ and argued that it provided all stakeholders with ‘the opportunity to work together towards a common goal’.³ A day after the deal was released, she was reported as saying that one aspect of this common goal would be working on:

... ways of turning the new forest reserves — one of the nation’s biggest conservation gains — into carbon credits, worth up to an estimated \$2.4 billion by 2050.⁴

There are several different types of carbon credits that could be generated by reducing or stopping harvesting in Tasmania’s multiple use public native forests (i.e. native forest in state forest areas), the two most important being forest management (FM) credits and Australian carbon credit units (ACCUs). FM credits (and FM debits) are the credits (debits) that will be recorded in Australia’s international greenhouse compliance accounts if it accounts for forest management in the post-2012 era. Reductions in native forest harvesting reduce net forest management emissions, thereby ‘automatically’ leading to the recording of FM credits (or reduced FM debits) in Australia’s accounts. ACCUs are offset credits issued under the *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth) (CFI Act). At present, projects

¹ Australian Broadcasting Corporation (ABC) (2012). *Tasmanian forest peace deal done*.

² Schneiders, L (2012). *Courageous compromises presage a sustainable future for the Apple Isle community*.

³ Denholm, M (2012). *If agreement fails Tasmania will have no forest industry, warns Premier Lara Giddings*.

⁴ Denholm, M (2012). See also Denholm, M (2012). *Trees key to making a killing on carbon*.

involving the cessation or reduction of harvesting in native forests are not eligible to participate in the CFI. However, there is an expectation that amendments will be made to the CFI Act and regulations to facilitate this in the near future.

Stopping or reducing harvesting in Tasmania's multiple use public native forests has the potential to generate a significant number of carbon credits.⁵ Given this, it would have been expected that carbon issues would have been central to the TFA negotiations. From the available public material, this does not seem to have been the case. The negotiations focused on the issues that have defined the positions of the parties involved in the TFA for the past 30 years: the industry representatives concentrated on restructuring assistance and subsidies, while the efforts of the conservation groups were aimed at the creation of new forest reserves. In allowing the TFA-IGA process to be dominated by the interests of these groups, it appears the Tasmanian Government has missed an opportunity to secure billions for the broader Tasmanian community. This is a product of the fact that, while the Tasmanian Premier is now proposing to generate carbon credits from the TFA-IGA outcome, the capacity to do this no longer exists. While the Commonwealth will receive a substantial number of FM credits as a result of the downsizing of the Tasmanian forest industry, neither the Tasmanian Government nor Forestry Tasmania are likely to be able to generate ACCUs from the new forest reserves. As a consequence, the Commonwealth stands to be the big winner from the peace deal as it will receive the associated FM credits and be able to monetise them through the carbon pricing scheme.

The object of this paper is to analyse how many FM credits the Commonwealth will receive as a result of the fall in harvesting in Tasmania's multiple use public native forests and explain how it derives a financial benefit from them. The paper is set out as follows. The following section reviews the Tasmanian Government's proposal to generate carbon credits from the TFA-IGA process. The paper then describes how reductions in harvesting in multiple use public native forests lead to the generation of FM credits and an increase in Commonwealth carbon unit revenues. This is followed by an analysis of the number and value of the FM credits that could be generated as a consequence of the TFA-IGA. The paper finishes with an overview of the winners and losers and implications.

⁵ Macintosh, A (2012). *Tasmanian Forests Intergovernmental Agreement: An assessment of its carbon value*.

The TFA carbon credit proposal

It is understood that the Tasmanian Government has engaged CO₂ Australia to undertake a feasibility study into how to convert the TFA-IGA outcome into a CFI project so as to allow for the generation of ACCUs.⁶ The primary difficulty facing this proposal — in addition to the fact that avoided and delayed native forest harvesting projects are currently ineligible under the CFI Act — is that the general rule under the CFI is that ACCUs are only issued for abatement that would not otherwise occur (i.e. it must be ‘additional’).⁷ The terms of the TFA-IGA provide for reduced native forest harvesting and the creation of new forest reserves. This suggests that anything stemming directly from, or under, the TFA-IGA will not be considered additional and will, therefore, be ineligible for ACCUs.

Consistent with this, Prime Minister Gillard wrote to the Tasmanian Premier in July 2011 to emphasise that the Commonwealth would not allow Tasmania to claim credits for reserves if it had already provided money to facilitate their creation. This message was reiterated in a letter to the Tasmanian Minister for Climate Change dated 10 October 2012 from the Parliamentary Secretary for Climate Change and Energy Efficiency, Mark Dreyfus, where he stated:

The Commonwealth’s position is that Tasmania should be able to realise the carbon benefits associated with trees placed in conservation reserves as a result of the IGA. [However] ... the Commonwealth’s position is also that there should be no ‘double dipping’ with respect to carbon credits that may result from forest land entering into new conservation reserves as a result of Commonwealth funding. Any funding provided to support the establishment of reserves would need to be accounted for when determining the potential for carbon crediting under the CFI.⁸

While the Parliamentary Secretary’s reference to ‘carbon benefits’ is ambiguous, the message seems relatively clear: Tasmania will not be able to double-dip by establishing a CFI project that incorporates the reserve outcomes from the TFA-IGA. Consequently, the impact of the TFA-IGA appears to be that, while Tasmania is likely to receive around \$300 million to support the restructuring of the forestry industry, it will not be able to claim ACCUs in relation to the creation of the Commonwealth-funded reserves.

⁶ Denholm, M (2012). *Trees key to making a killing on carbon*.

⁷ Macintosh, A & Waugh, L (2012). *An Introduction to the Carbon Farming Initiative: Key principles and concepts*.

⁸ Dreyfus, M (2012). *Letter to Ms Cassy O’Connor*, Commonwealth of Australia, 10 October 2012.

The FM credits

Under the Kyoto Protocol, FM is defined as ‘a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner’.⁹ This definition allows for two approaches to be used when identifying FM lands.¹⁰ Under the first (the narrow approach), the party can define a set of specific practices (e.g. harvesting, thinning, fertilization and fire suppression) and the FM lands are those subject to these practices since 1990. The second approach (the broad approach) requires the party to define a system of FM practices and identify the area subject to these practices in the commitment period. Parties can use a mix of these approaches, which is what Australia has signalled it will do if it accounts for FM in the post-2012 period.¹¹ Under the Australian approach, FM lands will include all multiple use public native forests that were available for harvest at December 2009, private native forests subject to harvesting since 1990 and pre-1990 plantations.¹² The adoption of this definition will mean that Tasmania’s multiple use public native forests (i.e. state forests available for harvest at December 2009) will fall within Australia’s FM lands.

During the first commitment period of the Kyoto Protocol (2008-12), Australia did not account for FM. Its coverage of land use, land-use change and forestry (LULUCF) emissions and removals was confined to Article 3.3 activities: afforestation, reforestation and deforestation. Australia chose not to account for any Article 3.4 activities, including FM, because of concerns about inter-annual variability and major natural disturbances (e.g. wildfires and droughts).¹³

The Australian Government has announced that, if certain conditions are satisfied, it will participate in the second commitment period of the Kyoto Protocol (KP2), which will run from 1 January 2013 to either 31 December 2017 or 31 December 2020. If Australia does participate, it will be required to account for LULUCF in accordance with the rules agreed at the Durban Climate Conference in 2011 (the 17th Conference of the Parties to the UNFCCC and 7th Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol).¹⁴ There are three notable aspects of these new accounting rules that are relevant for current purposes.

- FM accounting is compulsory in KP2 (it was optional in the first commitment period).
- FM accounting will be based on a reference level (or baseline-and-credit) system. Under this approach, FM reference levels are supposed to be set for each participating country, representing an estimate of net FM emissions over the commitment period in the absence of policy changes from 31 December 2009.¹⁵ The

⁹ UNFCCC Secretariat (2006). *Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its first session, held at Montreal from 28 November to 10 December 2005. Addendum – Part Two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its first session.*

¹⁰ Penman, J et al. (2003). *Good Practice Guidance for Land Use, Land-use Change and Forestry.*

¹¹ Australian Government (2011). *Submission to the AWG-KP: September 2011 — Forest Management Reference Level Submission.*

¹² Other forests potentially fall with the scope of Australia’s FM lands; however, they are not relevant for current purposes.

¹³ Australian Government (2008). *Carbon Pollution Reduction Scheme: Australia’s Low Pollution Future: White Paper*; Australian Government (2008). *Land Use, Land-Use Change and Forestry (LULUCF) Sector: Submission to the AWG-KP and AWG-LCA.*

¹⁴ UNFCCC Secretariat (2011). *Land use, land-use change and forestry.*

¹⁵ UNFCCC Secretariat (2011). A number of countries have submitted reference levels that do not accord with this principle. See Macintosh, A (2011). *Are forest management reference levels incompatible with robust climate outcomes? A case study on Australia.*

credits and debits recorded during the commitment period will be calculated by subtracting the reference level from the actual reported net emissions. Parties whose emissions are higher than the reference level will incur FM debits and those whose emissions are below the reference level will receive FM credits. Australia's proposed FM reference level was based on the mean harvest rate in multiple use public native forests over the period 2002-2009, and log production in 2008.¹⁶

- FM credits, and credits associated with FM project activities undertaken through the joint implementation (JI) mechanism, are subject to a combined cap of 3.5 per cent of total base year emissions excluding LULUCF. For Australia, the 3.5 per cent cap is likely to equate to a limit of 15.4 Mt CO₂-e yr⁻¹ over the commitment period.¹⁷

If, as expected, Australia accounts for FM in the post-2012 period, any reduction in harvesting in multiple use public native forests would reduce recorded net emissions from FM but it would not result in a reduction in recorded national or global emissions. This is because Australia's mitigation commitments involve the setting of a cap on net national emissions for the period 2013-2020, and ultimately through to 2050. Due to the existence of this net emissions limit, abatement actions in sectors that count towards the national total will not usually result in overall national emissions reductions; a reduction in emissions in one sector merely allows for greater emissions in another. Reductions in absolute emissions should only occur if the abatement actions lead directly to the lowering of the national target (e.g. cancellation of assigned amount units or other equivalent units) or, in the event that national emissions end up being below the target in one accounting period, the Australian Government decides not to carry-over the surplus into the next period.

While a reduction in harvesting in multiple use public native forests should not affect the net national emissions outcome, it will have important economic impacts related to the operation of the carbon pricing scheme and the CFI, and the capital flows associated with international emissions units. In particular, to the extent that a fall in harvesting leads to the creation of FM credits (or avoidance of FM debits) for which no corresponding ACCUs are issued, it should lead to a relative increase in the carbon pollution cap under the *Clean Energy Act 2011* (Cth) (CE Act).

Herein lies the benefit of the TFA to the Australian Government. By creating the new reserves and lowering the high quality sawlog guarantee, the TFA should lead to a reduction in harvesting in Tasmania's multiple use public native forests. This will lead to the generation of FM credits (or avoidance of FM debits), thereby producing a relative decrease in the emissions in the sectors not covered by the CE Act (uncovered sector emissions). The carbon pollution cap under the CE Act is likely to be derived by subtracting an estimate of the total uncovered emissions from the national target. Hence, by reducing the uncovered emissions, the TFA should allow for an increase in the carbon pollution cap. Any increase in the carbon pollution cap allows the Australian Government to auction more carbon units, thereby increasing its revenues. For example, if due to changes in forest management practices Australia receives 1 million FM credits per year, then the Commonwealth will be able to sell an additional million carbon units to liable entities under the CE Act. If the carbon price is \$10 per tonne, the Commonwealth would gain an additional \$10 million per year from permit sales.

During the fixed charge period of the carbon pricing scheme (1 July 2012 to 30 June 2015), there is no carbon pollution cap. Covered sector emissions face a set carbon price but there is no absolute limit on emissions from these sectors under the CE Act. Despite this, a

¹⁶ Australian Government (2011); Macintosh, A (2011).

¹⁷ Australia's 1990 base year estimate (excluding LULUCF) under the Kyoto Protocol is 416.2 Mt CO₂-e (see UNFCCC Secretariat (2009). *Report of the review of the initial report of Australia*). However, it is likely to be adjusted upwards to around 440 Mt CO₂-e when new accounting rules take effect in 2015.

reduction in native forest harvesting over this period should still affect the revenues from the carbon pricing scheme. This is because Australia's mitigation commitments are likely to be cumulative. That is, there will be a national target (or national emissions limit) for the entire accounting period (e.g. 2013 to 2020) rather than a single year (2020) and the targets will be transferrable within the period. Due to this, reductions in uncovered sector emissions in the fixed charge years should allow for higher relative national targets in the flexible charge years, leading to higher carbon pollution caps and greater scheme revenues.

How much will the Australian Government make out of the TFA-IGA?

The FM credits that Australia could potentially receive as a result of the TFA were estimated using a mirror of the method adopted by the Australian Government in creating its FM reference level. Details of the method are provided in Appendix A. The method is based on the assumption that harvesting in Tasmania's multiple use public native forests falls in proportion to the reduction in high quality sawlog and special timbers removals compared to the mean over the period 2002-2009. The method also assumes two potential rates of domestic leakage: zero and 10 per cent (the 'no leakage' and 'leakage' scenarios respectively). The resulting FM credit estimates for the period 2013-2032 are provided in Table 1.

Table 1 Estimated FM credits associated with the TFA, 2013-2032

Year	FM credits (million)	
	No leakage	Leakage
2013	6.53	5.88
2014	6.21	5.59
2015	6.83	6.15
2016	7.28	6.55
2017	7.62	6.86
2018	7.89	7.10
2019	8.12	7.31
2020	8.24	7.42
2021	8.33	7.50
2022	8.45	7.60
2023	8.54	7.69
2024	8.64	7.77
2025	8.74	7.86
2026	8.83	7.95
2027	8.91	8.02
2028	8.99	8.09
2029	9.06	8.15
2030	9.09	8.18
2031	9.14	8.22
2032	9.18	8.26
Total (2013-2032)	164.6	148.2
Mean (2013-2032)	8.2	7.4

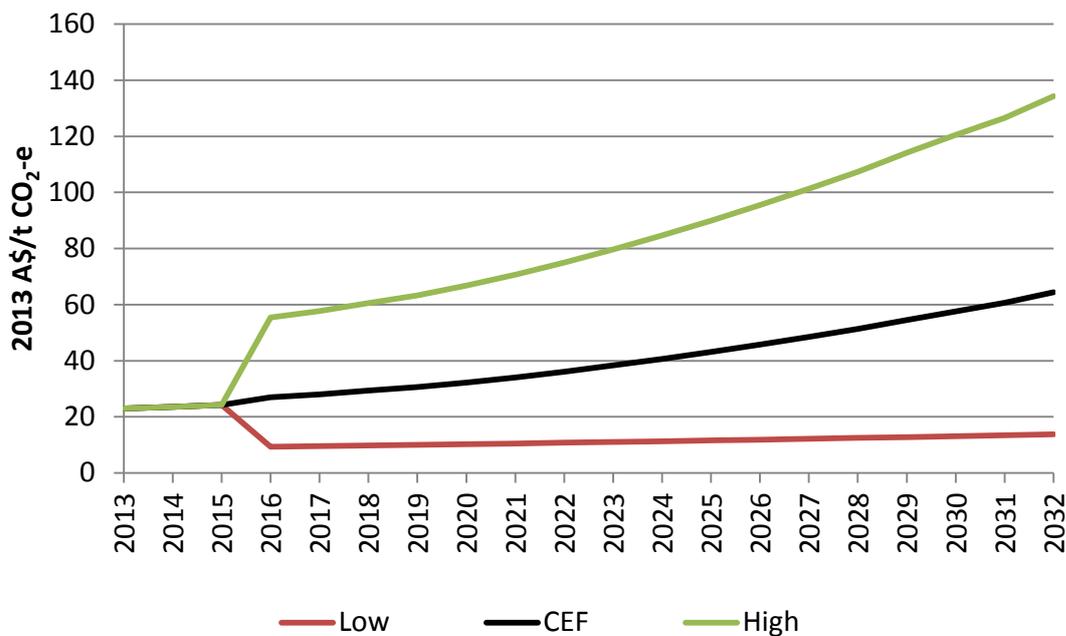
To estimate the financial value of the FM credits, the following key assumptions were adopted:

- all FM credits generated in the fixed price period are evenly re-allocated across the period 2016-2020;

- the FM credits are not affected by the 3.5 per cent cap on FM credits under the KP2 rules;
- the carbon price follows one of three scenarios:
 - the Clean Energy Future (CEF) price path, where the carbon price follows the CE Act's statutory price until the end of the fixed price period (2014-15) then tracks the Australian Treasury's Clean Energy Future price path from the *Strong Growth, Low Pollution* report over the period 2015-16 to 2031-32;¹⁸
 - a low price path, where the carbon price follows the statutory price until the end of 2014-15, falls to \$10 (nominal) in 2015-16 and then grows at 2.5 per cent real through to 2031-32; and
 - a high price path, where the carbon price follows the statutory price until the end of 2014-15 and then tracks the *Strong Growth, Low Pollution* report's high price path through to 2031-32.

The three price paths are shown in Figure 1.

Figure 1: Clean Energy Future, Low and High carbon price scenarios, real 2013 \$/t CO₂-e



Source: Australian Treasury (2011), *Strong Growth, Low Pollution: Modelling a Carbon Price*, and author estimates.

To calculate the net present value (NPV) of the revenues from the FM credits, a social time preference rate of 2.7 per cent was used, based on a pure time preference rate of 1.5 per cent (including catastrophic risk), an elasticity of marginal utility of consumption of 1 and a per capita consumption growth rate of 1.2 per cent for the projection period.¹⁹ The choice of social time preference rate is a controversial issue and one that has been subject to

¹⁸ Australian Treasury (2011). *Strong Growth, Low Pollution: Modelling a Carbon Price*.

¹⁹ The pure time preference rate and elasticity of marginal utility of consumption were taken from the HM Treasury *Green Book* (HM Treasury (2003). *The Green Book: Appraisal and Evaluation in Central Government*). The per capita consumption growth rate was taken from the *Strong Growth, Low Pollution* report's Clean Energy Future scenario (Chart 5.38) (Australian Treasury (2011)).

extensive debate within the economic and environmental literature.²⁰ The rate chosen here is the author's preference but there are valid reasons for using higher or lower alternatives. The use of a higher (lower) social time preference rate would decrease (increase) the NPV estimates.

The total value of the FM credits under the no leakage scenario in real \$A (2013), and NPV, for the periods 2013-2020 and 2013-2032 are shown in Table 2. The equivalent results for the leakage scenario are shown in Table 3. The annual real value of the FM credits under both the leakage and no leakage scenarios is provided in Appendix B.

Table 2: Aggregate value of FM credits under the no leakage scenario, real \$A (2013) and NPV, for the periods 2013-2020 and 2013-2032

Price scenario	Low	Clean Energy Future	High
2013-2020			
Real value (A\$ 2013)	\$574	\$1,732	\$3,575
NPV (A\$ 2013)	\$501	\$1,512	\$3,120
2013-2032			
Real value (A\$ 2013)	\$1,856	\$6,838	\$14,224
NPV (A\$ 2013)	\$1,391	\$5,016	\$10,427

Table 3: Aggregate value of FM credits under the leakage scenario, real \$A (2013) and NPV, for the periods 2013-2020 and 2013-2032

Price scenario	Low	Clean Energy Future	High
2013-2020			
Real value (A\$ 2013)	\$516	\$1,559	\$3,217
NPV (A\$ 2013)	\$451	\$1,361	\$2,808
2013-2032			
Real value (A\$ 2013)	\$1,671	\$6,154	\$12,801
NPV (A\$ 2013)	\$1,252	\$4,515	\$9,384

As Tables 2 and 3 show, the TFA should earn the Australian Government in the order of \$6-\$7 billion (\$1.7-\$14.2 billion) in real 2013 \$A over the period 2013-2032. In just the period 2013-2020, which reflects the likely length of KP2, the FM credits associated with the TFA and the decline in harvesting in Tasmania's forests are likely to be worth around \$1.6-\$1.7 billion (\$0.5-\$3.6 billion) (real \$A 2013). The magnitude of the value is reflected in the fact that, in the first year of the flexible charge period (2016), the FM credits are likely to generate \$270-\$300 million (real \$A 2013) for the Australian Government, roughly the same amount it will provide under the TFA-IGA.

It should be noted that the method adopted here assumes that the fall in harvesting relative to the 2002-2009 mean is solely attributable to the TFA. In truth, Tasmania's native forestry sector has undergone a significant contraction since the mid-2000s as a result of market and management factors unrelated to the TFA-IGA process, particularly a decline in demand in

²⁰ Macintosh, A (2012).

export markets and projected increases in plantation wood supply.²¹ Due to this, even without the TFA, there is the potential that harvesting could fall to the levels in the agreement, possibly further. High quality sawlog removals in 2011-12 were below the levels guaranteed under the TFA.²² The TFA's significance is that it should ensure that harvesting remains well below the 2002-2009 mean, even if it is above the levels seen in 2011-12. In this respect, it performs an insurance policy function for the Australian Government, effectively guaranteeing a substantial flow of FM credits and related CE Act revenues.

²¹ Forestry Tasmania (2007). *Sustainable High Quality Eucalypt Sawlog Supply from Tasmanian State Forest: Review No.3*.

²² Forestry Tasmania (2012). *Stewardship Report 2011-12*.

The winners and losers from the TFA

The above analysis of the FM credits suggests that the big winner from the TFA is likely to be the Australian Treasury. By guaranteeing that harvesting in Tasmania's multiple use public native forests remains below the levels seen over the period 2002-2009, the TFA should lead to the Australian Government receiving an average of 7.4-8.2 million FM credits (or avoided debits) per year over the period 2012-2032. These credits are likely to be worth in the order of \$6-\$7 billion (\$1.7-\$14.2 billion) in real 2013 \$A. In return, the Tasmanian Government will get \$300 million for industry assistance, restructuring and other related measures.

It is unclear to what extent the Tasmanian Government was aware of the FM credit implications when it negotiated the IGA. From the material on the public record, it appears the State Government's focus has been on how to prop-up the native forest industry while it is in a state of crisis. Understandably, it also seems to have been concerned about forestry industry workers and assisting forestry-dependent communities. The price paid for this appears to have been that it has not properly considered how the forest resource could be best managed to maximise the welfare of Tasmanian residents.

A possibility remains that Tasmania could still access ACCUs under the CFI Act for the reduction in harvesting associated with the TFA-IGA. For this to occur, the Australian Government would have to be persuaded to alter its stated position on the additionality of the abatement. Regulations would also have to be made under the CFI Act to facilitate the establishment of a relevant project. Given the structure of the CFI, this appears unlikely. It would also set a poor precedent for the governance of the CFI, suggesting its rules can be bent to accommodate political concerns and the pleadings of special interests. An alternative is that the Tasmanian Government seek to renegotiate the terms of IGA to enable it to access some of the revenues associated with the relevant FM credits. The Tasmanian Government could also consider further reductions in harvesting to generate ACCUs. The difficulty with this option is that, with the reductions guaranteed under the TFA and similar falls in log production from native forests in other jurisdictions, the 3.5 per cent cap on FM credits may be full (or near full). Once the cap is full, any ACCUs generated by an FM project will presumably be non-Kyoto ACCUs that could only be sold into voluntary markets.

Implications

The key implications of the analysis in this paper are as follows.

- The Commonwealth is expected to receive more money from one year's worth of FM credits than the Tasmanian Government will receive under the TFA-IGA.
- The Tasmanian Government believes it can still realise carbon benefits from the TFA-IGA by generating ACCUs from the proposed forest reserves, a proposal that runs counter to the CFI rules and the Commonwealth's position on the administration of the CFI.
- In allowing the TFA-IGA process to be dominated by the interests of the forest industry and conservation groups, the Tasmanian Government has potentially missed an opportunity to secure billions for the broader Tasmanian community.

The Tasmanian Government could address the situation by seeking to persuade the Commonwealth to reallocate some the FM credit-related revenues to it when the benefits materialise.

Appendix A

Methodology for estimating FM credits from the Tasmanian Forest Agreement 2012

Rationale behind the method

To estimate the number of FM credits that will be generated as a result of the TFA, two scenarios were devised for the period 2013-2032 (the 'projection period'):

- the reference scenario, based on the assumption that harvesting continues at the rates seen over the period 2002-2009; and
- the TFA scenario, based on the assumption that the TFA is fully implemented.

There are three broad approaches that could be used to devise the reference and no harvest scenarios.

Approach A: *Government methods and datasets for reference and no harvest scenarios.*

This approach involves applying the Australian Government's FM reference level methodology and datasets to generate the reference and no harvest scenarios.

Approach B: *Government methods and datasets for reference scenario/alternative methods and datasets for no harvest scenario.* Under this approach, the Australian Government's FM reference level methodology and datasets are used to generate the reference scenario but an alternative method and/or datasets are used for the no harvest scenario.

Approach C: *Alternative methods and datasets for reference and no harvest scenarios.* Under this approach, the Australian Government's FM reference level methodology and datasets are rejected and an alternative method and datasets are used to derive both the reference and no harvest scenarios.

There is significant uncertainty associated with the models and data used to devise Australia's FM reference level. This is a product of a number of factors, including a lack of data on carbon stocks and fluxes in native forests, data gaps concerning the age-class distribution of native forests and the silviculture practices used in them, and the counterfactual nature of reference levels.²³ With improved data and models, it may be possible to devise a more accurate method that better reflects 'what the atmosphere sees', a fact acknowledged by the Australian Government.²⁴

While improvements in the Australian Government's method are possible, and the Government has flagged its intent to make changes in the future,²⁵ the use of either Approach B or C increases the risk of invalid results. Approach C would involve the use of methods and datasets unrelated to the Australian Government's accounting framework. The results may better reflect 'what the atmosphere sees' but are unlikely to better reflect the entries made in Australia's greenhouse accounts.

Approach B could ultimately be used by the Australian Government — the reference level could be treated as a fixed number, while the annual actual FM emissions are accounted for using evolving methods and datasets. Although this is a possibility, the Australian

²³ Macintosh, A (2012).

²⁴ Australian Government (2011); Australian Government (2012). *Australian National Greenhouse Accounts: National Inventory Report 2010*.

²⁵ Australian Government (2012).

Government has stated that it has no intention of adopting this approach due to the potential for ‘false’ debits and credits (debts and credits that arise from method or data changes rather than changes in management practices).²⁶

Due to these issues, Approach A was used for current purposes because it provides the best approximation of what will be recorded against Australia’s mitigation commitments over the projection period. Accordingly, in devising the reference and TFA scenarios, the objective was to mirror, to the greatest extent possible, the methods and data sets used to generate the Australian Government’s FM reference level.

Reference scenario

The Australian Government’s FM reference level is a projection of net FM emissions over the period 2013-2020 assuming no change in policies from December 2009. Here, the reference scenario was confined to a projection of net emissions from Tasmania’s multiple use public native forests. The projection period was also extended to 2032 to provide a more complete picture of the FM credit implications of the TFA.

In the Australian Government’s FM reference level, the carbon pools are confined to live above- and below-ground biomass, debris and harvested wood products (HWP). The soil carbon pool is assumed to be stable, providing no net emissions or removals (i.e. it is excluded). The same approach was adopted here. Consistent with the Australian Government’s method, the calculation of the reference level was split into two parts on the basis of the accounted carbon pools:

- carbon stock changes in the live biomass and debris pools; and
- carbon stock changes in the HWP pool.

Soil carbon was excluded.

Carbon stock changes in the live biomass and debris pools

In the Australian Government’s FM reference level, the projected carbon stock changes in the live biomass and debris pools were modelled using the non-spatially explicit Tier 2 capabilities of *FullCAM*.²⁷ Within the model, the forest area (Australia’s multiple use public forests and Tasmanian private native forests) was divided into six broad forest types (rainforest, tall dense eucalypt forest, medium dense eucalypt forest, medium sparse eucalypt forest, cypress pine forest and other forest), ten silvicultural systems and eight age classes, producing 73 forest type/silviculture/age class combinations. The carbon stock changes were modelled on the basis of the estimated area in each forest type/silviculture/age class combination using assumed forest type growth, turnover and decomposition rates. Harvest slash emissions over the period 2013-2020 were calculated using the forest type/silviculture/age class combinations and an assumption that the national harvest rate would equal the mean from the period 2002-2009.

To devise the reference scenario, a modified version of the approach adopted by the Australian Government was used.

- The scenario was generated using the Tier 2 capabilities of *FullCAM* (version 3.30.1).

²⁶ Australian Government (2012).

²⁷ Richards, G & Evans, D (2004). *Development of a carbon accounting model (FullCAM vers. 1.0) for the Australian continent*; Richards, G & Brack, C (2004). *A modelled carbon account for Australia’s post-1990 plantation estate*; Brack, C et al. (2006). *Integrated and comprehensive emissions estimation for greenhouse gases*; Australian Government (2011); Australian Government (2012).

- The *FullCAM* representative plot file data used to devise Australia's reference level were obtained from the Australian Government.
- Of the 73 representative plot files within the Australian Government's model, harvesting occurred in 55 of them over the period 2002-2009. For the purposes of devising the reference scenario, one of the harvest plot files was excluded on the basis that it was inapplicable to Tasmania's native forests (a cypress pine harvest plot — no cypress harvesting occurs in Tasmania). The remaining 54 harvest files represent tall dense eucalypt forest (TDEF), medium dense eucalypt forest (MDEF) and medium sparse eucalypt forest (MSEF) across different age classes (juvenile, immature, mature, senescent, multi-aged, unknown age).
- To construct the reference scenario, the national mean harvest rate for the period 2002-2009 in these 54 representative plot files was used (96,958 ha yr⁻¹). That is, it was assumed that, over the projection period, harvesting occurs on the same plot types, employing the same harvest techniques as occurred between 2002 and 2009. To assign a harvest area to Tasmania's public native forests, the national area was reduced on a pro rata basis using broadleaved native roundwood removals (i.e. broadleaved roundwood removals from Tasmania's multiple use public native forests as a proportion of total national roundwood removals from all multiple use public native forests and Tasmanian private native forests over the period 2002-2009).²⁸
- The plots were assumed to form part of a single estate and the carbon stock changes on the estate were modelled using an estate simulation start date of 1960 and an end date of 2032.
- Carbon stock changes on the parts of Tasmania's public native forest estate that are not subject to harvest over the projection period were not modelled. This is due to the fact that carbon stock changes in these areas are the same in all scenarios, thereby cancelling each other out under the FM reference level accounting system. For the same reason, the impacts of wildfires were excluded from all scenarios.²⁹ Similarly, non-harvest related fuelwood removals were assumed to be the same in the reference and no harvest scenarios, and were therefore not modelled.

Carbon stock changes in the HWP pool

In the Australian Government's FM reference level, projected carbon stock changes in the HWP pool were estimated using the harvested wood products model that is used for the purposes of Australia's *National Inventory Reports*.³⁰ When used for the purpose of *National Inventory Reports*, the model estimates carbon stocks and flows from all wood products in Australia, regardless of their origin. The model was adjusted for the purposes of the FM reference level to exclude imports and include exports to ensure consistency with the proposed accounting framework. Adjustments were also made to the decay rate assumptions. For all domestically produced and consumed wood products, the standard decay rates in the model were used. With exports, the model was used to classify exported products into decay class pools but losses from the pools were determined in accordance with the default decay rates set out in the 'Revised proposal by the Chair, Draft decision - /CMP.6 (Land use, land-use change and forestry)'.³¹

²⁸ To ensure consistency with the Australian Government's methods, Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) data on roundwood removals were used for these purposes. See ABARES (2012). *Australian Forest and Wood Products Statistics*.

²⁹ It is currently unclear how the Australian Government will account for wildfires. Since 2007, the Australian Government has repeatedly stated that it wants to exclude the impacts of wildfires on the basis that the effects are non-anthropogenic. It is assumed for the purposes of this report that Australia's LULUCF accounting rules reflect this intent.

³⁰ Richards, G et al. (2007). *Developing a carbon stocks and flows model for Australian wood products*; Australian Government (2011); Australian Government (2012).

³¹ FCCC/KP/AWG/2010/18/Add.1.

In estimating HWP emissions in its FM reference level (and the *National Inventory Reports*), the Australian Government did not use the log removal estimates generated by *FullCAM*. Separate ABARES wood production data were used for this purpose. For the FM reference level, the Government assumed that annual wood production and the proportion of production allocated to end-use categories remain stable at 2008 levels throughout the period through to 2020.

For current purposes, carbon stock changes in the HWP pool were estimated using a simplified wood flow model and the IPCC first-order decay function,³² assuming half-lives of 2 years for paper, 25 years for wood panels and 35 years for sawn wood. The simplified wood flow model was derived from the wood flow assumptions in the Australian Government's HWP model³³ and other sources.³⁴ The log data used in the model were obtained from ABARES.³⁵ As in the Australian Government's FM reference level, it was assumed for the purposes of the reference scenario that wood production remains constant at 2008 levels over the projection period.

No harvest scenario

The method used to generate the no harvest scenario was the same as that applied for the reference scenario, only with adjusted harvest and wood production projections.

To estimate the carbon stock changes in the live biomass and debris pools, the 54 representative harvest plots used in the reference scenario were replicated and the harvest events removed. This provided a total of 108 representative plot files for the TFA scenario (54 harvest plots and 54 no harvest plots). The area allocated to each representative harvest plot was reduced on a pro-rata basis to account for the assumed reduction in native forest harvesting under the TFA. The TFA states that 137,000 m³ of high quality sawlogs will be guaranteed from across the state and that, until further agreement is reached, special species timber removals will be as per the FT Special Timbers Strategy.³⁶ Peeler wood and pulpwood supply is unspecified. The minimum supply of high quality sawlogs involves a 27 per cent increase on 2011-12 levels. However, it is 55.4 per cent below the 2002-2009 mean. The supply of special timbers under the Special Timbers Strategy (12,500 m³ yr⁻¹) is similar to the levels seen in 2011-12 but is 28.2 per cent below the 2002-2009 mean. On this basis, it was assumed that, under the no harvest scenario for the period 2014-2032, the harvest area is 55.2 per cent below the 2002-2009 mean. The harvest area for 2013 was assumed to be the same as in 2012, which was derived from the annual reports of Forestry Tasmania and ABARES data.³⁷ For the entire projection period, the areas deducted from each representative harvest plot to account for the fall in harvesting were added to the corresponding no harvest plot, thereby ensuring the modelled estate covered the same area in the reference and TFA scenarios.

To project carbon stock changes in the HWP pool, the simplified wood flow model and IPCC first-order decay function were used with modified wood supply estimates. For the period up to 2012, data on actual log production were obtained from the annual reports of Forestry

³² Eggleston, S et al. (2006), *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

³³ Pöyry, J (1999). *Usage and Life Cycle of Wood Products*; Australian Government (2012).

³⁴ Burns, K et al. (2009). *ABARE 2007 sawmill survey report*; S Tucker et al. (2009). *Life Cycle Inventory of Australian Forestry and Wood Products*.

³⁵ ABARES (2012). *Log removals – public and private forests, unpublished data*; ABARES (2012). *Australian Forest and Wood Products Statistics*.

³⁶ Forestry Tasmania (2010). *Special Timbers Strategy*.

³⁷ Forestry Tasmania (2012); ABARES (2012). *Log removals – public and private forests, unpublished data*; ABARES (2012). *Australian Forest and Wood Products Statistics*.

Tasmania. Log production in 2013 was assumed to be the same as in 2012. For the period 2014-2032, it was assumed that log production fell by 55.2 per cent.

There is the potential for the TFA to result in 'leakage', or the transfer of wood production to other areas, both in Australia and overseas. Any leakage to forests in other countries is irrelevant for current purposes because it will have no impact on the FM credits that are recorded in Australia's greenhouse accounts. In contrast, leakage within Australia will reduce the FM credits that are recorded in Australia's accounts and thereby reduce the benefits associated with the project. Another possibility is that the exclusion of harvesting from the FMP forests could prompt increased reforestation as the forestry sector looks for alternative sources of long-term wood supply. This form of leakage would increase recorded LULUCF credits.

Projecting the likely rate of leakage within Australia is difficult. The capacity to increase log removals in multiple use public native forests and private native forests differs between jurisdictions because of resource constraints, state regulations and commitments under the Regional Forest Agreements. There may also be community resistance to any plans to increase the intensity of harvesting in native forests in response to the TFA. How these resource, regulatory and political factors might interact to facilitate or constrain leakage is unclear.

For simplicity, two leakage scenarios were adopted here: a no leakage scenario and a leakage scenario, in which it was assumed there is 10 per cent domestic leakage. In the no leakage scenario, it was assumed that harvesting in other multiple use public native forests and Tasmanian private native forests remains at 2011 levels.

Appendix B

Table B1 Annual real value of the FM credits under the no leakage scenario, real \$A (2013), 2013-2032

	Price scenario		
	Low	CEF	High
2013	0	0	0
2014	0	0	0
2015	0	0	0
2016	\$104	\$302	\$621
2017	\$110	\$323	\$666
2018	\$115	\$347	\$715
2019	\$120	\$369	\$762
2020	\$125	\$391	\$811
2021	\$88	\$284	\$589
2022	\$91	\$305	\$634
2023	\$94	\$327	\$681
2024	\$98	\$351	\$731
2025	\$101	\$377	\$786
2026	\$105	\$404	\$843
2027	\$109	\$432	\$903
2028	\$112	\$462	\$965
2029	\$116	\$494	\$1,034
2030	\$119	\$524	\$1,096
2031	\$123	\$554	\$1,156
2032	\$127	\$591	\$1,233

Table B2 Annual real value of the FM credits under the leakage scenario, real \$A (2013), 2013-2032

	Price scenario		
	Low	CEF	High
2013	0	0	0
2014	0	0	0
2015	0	0	0
2016	\$94	\$271	\$559
2017	\$99	\$291	\$599
2018	\$104	\$312	\$643
2019	\$108	\$332	\$686
2020	\$112	\$352	\$730
2021	\$79	\$255	\$530
2022	\$82	\$275	\$570
2023	\$85	\$295	\$612
2024	\$88	\$316	\$658
2025	\$91	\$339	\$707
2026	\$94	\$364	\$759
2027	\$98	\$389	\$813
2028	\$101	\$416	\$868
2029	\$104	\$445	\$930
2030	\$107	\$471	\$986
2031	\$111	\$499	\$1,040
2032	\$114	\$532	\$1,109

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