

Cost to post-1989 participants registered in the ETS under the stock change accounting method and regulations

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Abstract

The stated purpose of the Climate Change Response Act 2002 is to support and encourage efforts to reduce greenhouse gas (GHG) emissions. Despite this, the current application of the stock change accounting method on the harvest of forest is to the economic detriment of existing post-1989 ETS participants, and the negative impact increases with length of registration and an increase in the price of carbon. This is because it places the entire burden of the reduction in carbon stock on harvesting on the participant with no offsetting benefit, and this is compounded by a rigid Carbon Accounting Area (CAA) specification that is impractical for good forest management. As a transitional arrangement the rigid CAA should be relaxed by applying the practices that allow for the flexible removal of land from a CAA. As this would account for emissions using the land area harvested it is a cost-effective method of operating within a single CAA. It is recommended that the change to a Flexi-CAA approach be made immediately for participants under the stock change accounting method, and backdated for those who filed returns for the second mandatory emission return (MER) period.

Introduction

This paper deals with the burden imposed on forest owners participating in the Emissions Trading Scheme (ETS), with compliant forests planted post-1989 and registered in the ETS on or before 2018. These forests are mainly small-scale (less than 1,000 ha) and make the most significant contribution in offsetting New Zealand's gross emissions (NZ Productivity Commission (NZPC), 2018, 31). In their review of the contribution of forestry to reducing New Zealand's emissions, the NZ Productivity Commission noted the high administrative costs imposed on forest owners by the ETS (NZPC, 2018, 330).

This paper explains the burden placed on participants on harvest, and for some participants this is a significant financial burden. We conclude with the finding that the current form of the ETS has some significant inconsistencies that can cause significant financial harm to forest owners, which will impact future owners' behaviour. This issue is not discussed in

the Ministry for Primary Industry (MPI) review of the ETS forestry accounting proposals (MPI, 2019a), the consultation document on the proposed changes to the Climate Change (Forestry Sector) Regulations 2008 (the Regulations) or in the text of the Climate Change Response (Emissions Trading Reform) Amendment Bill. The Government has indicated that issues facing current participants will be revised in 2021 (Te Uru Rākau, 2019, 4). We argue that *transitional arrangements* are urgently needed to minimise harm to forestry before decisions are made on the entry of existing participants into the average accounting method. First, however, we will discuss the Climate Change Response Act 2002 (the Act) and the Regulations 2008 that give rise to this situation.

Post-1989 forests and the stock change accounting method

Participating land is recorded in the ETS as Carbon Accounting Areas (CAAs). This is a fixed geographical/spatial unit defined by the participant on registering the land in the ETS, and can only be changed by removal of the CAA completely and re-entry as a new CAA, or by removal of land from the CAA. Either option requires some repayment of allocated units. Within a CAA there can be a mix of species and age classes. It is important to understand this administrative unit is unrelated to forest management boundaries due to silvicultural treatment, practical logging settings, market conditions or environmental considerations that occur after registration. There could be several decades between initial registration and harvesting.

The inflexible nature of the fixed CAA, given the practical need by participants to change areas over time, is a common problem for existing participants who entered young or immature stands into the ETS. The problems caused by an inflexible CAA will only become worse as the administration of the ETS becomes more complex. The oldest post-1989 eligible stands at commencement of the ETS in 2008 were 18 years old, arguably still 10 years from harvest. In our experience, most participants at that stage had no appreciation of the pending complications arising at harvest or the limitations and financial burden of the fixed CAA unit. This particularly applies to participants who have re-mapped CAAs and wish to add or remove an area, or to the large number who have transferred ownership pre- or post-harvest.

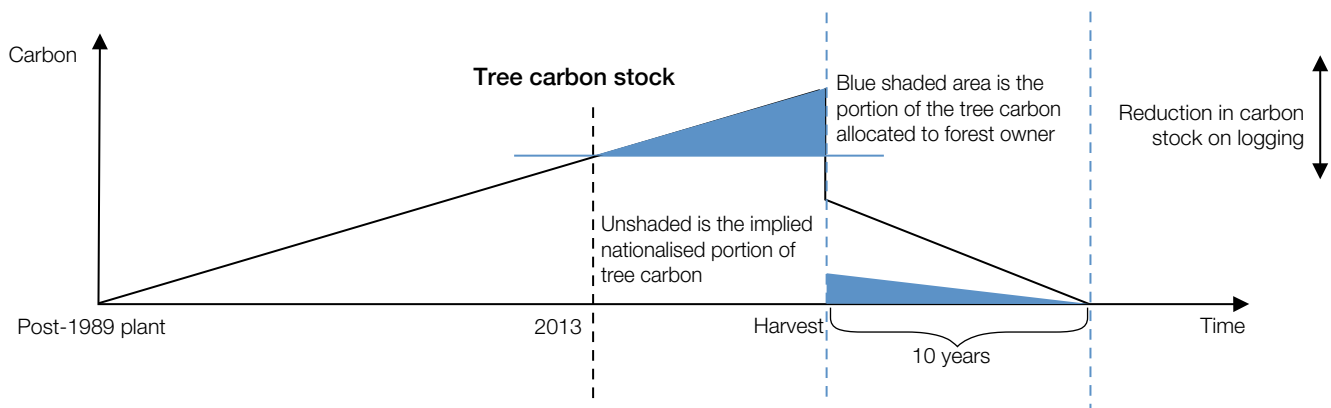


Figure 1: Simplified single age class forest carbon stock and annual change in carbon, with allocation of units to participant from 1 January 2013

Compounding this, under strict rules participants may be subject to pedantic monitoring of CAAs by MPI where new imagery provides greater mapping accuracy than existed 10 years ago. This particularly applies to Field Measurement Approach participants who may have much greater data collection costs resulting from rules which require new sets of plots to be allocated following any change in CAA area. Recently, MPI advised they will be auditing all participants before the end of Commitment Period 3 (CP3) ending 31 December 2022, and the burden of mapping accuracy and consequences on carbon accounting rests solely with the participant. Forest growth since 2008, and better aerial and satellite imagery, will result in boundary discrepancies for possibly every participant! Boundary changes always produce a negative result and liability for the participant to surrender carbon units.

Participants must account for the change in carbon stock in a CAA (section 62 of the Act) when filing voluntary or mandatory returns. Under the existing accounting method, the calculation requires consideration of the change in carbon stock in a CAA over the period covered by the return, and for the decay of any residuals from the first crop. Participants are likely to be aware that at harvest, under section 190 of the Act: ‘a participant ... is not liable to surrender more units in relation to any carbon accounting area ... than the unit balance of that ... carbon accounting area.’

Participants may not fully recognise that at harvest, the obligations on a CAA extend to the *full life-cycle* of the crop as a result of the removal of carbon through logs and decaying residues. That is, the participant has had the benefit of carbon allocations from sequestration from registration in the ETS, but has the liability for harvest residue from the date of planting. The cap on liability to surrender units is therefore a smokescreen and grossly penalises existing participants. The true liability is significantly more as participants have accountability for all below-ground carbon, so that is a liability exceeding the cap.

The calculation of the change in carbon stock is set out in sections 20 and 21 of the Regulations. It is important to note that while much of the explanation of the benefits of the proposed averaging method used

for post-2019 planting is based on the life-cycle of the forest (MPI, 2019a, 19; Te Uru Rākau, 2019, 10–11), this concept is absent in the regulations that apply to existing participants. They must account for discrete five-yearly changes. The presumption is therefore that forestry participants are ‘emitters’ – who for some return periods are sequestering carbon.

Figure 1 provides a simplified depiction for a single age forest of the carbon stock of a first rotation in which the annual tree growth is constant. At harvest, logs are removed from the forest, and the remaining residuals decay at a constant rate over the next 10 years – this is the decay profile used in the Regulations (section 21(3)). The carbon from the date of planting to the participant entry into the ETS is unavailable to the participant. The carbon stock is in effect ‘nationalised’ by the state. Nonetheless, the Regulations make the participant responsible for the full reduction in carbon stock at harvesting in a Mandatory Emission Return (MER) period (see Figure 1). The ‘repayment’ of the emissions follows the residual decay profile, even though the number of units surrendered is capped at the number allocated.

As an example, where the forest is registered as a single CAA, the proportion of nationalised and participant allocated carbon stock by date of planting on entry into the ETS in 2013 and harvested at age 28 is shown in Figure 2 (see footnote to figure for assumptions). The figure shows that for a forest planted in 1990, 82% of the carbon is nationalised, with the remaining 18% allocated to the participant. The proportion allocated to participants rises steadily for younger forests. For forests planted before 1997, most of the carbon is nationalised.

This profile also shows the pre-registration emissions imposed on the participant. A participant with 1990 forest entering the ETS in 2013 would be faced with 456% ($82\%/18\% \times 100$) more emissions than occurred during their time of registration. This is the ratio of the nationalised-to-participant proportion of carbon expressed as a percentage, and as seen in Figure 2 this ratio decreases with the reduction in age of forest entering the ETS.

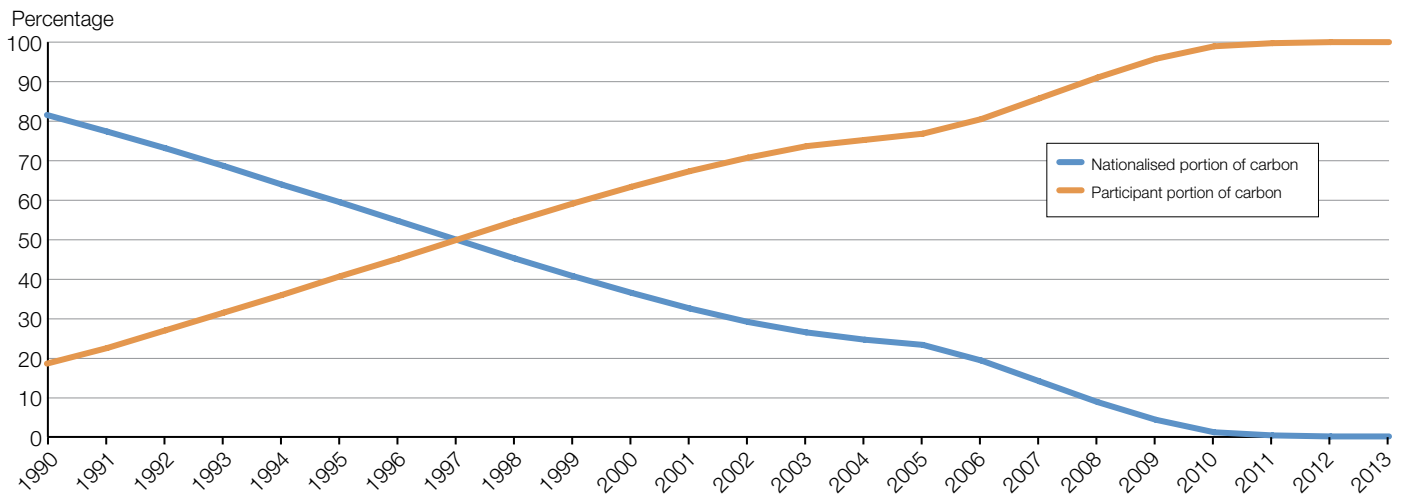


Figure 2: Proportion of carbon nationalised by planting date with 2013 entry into the ETS (per ha)*

* 1 ha *Pinus radiata* harvested at age 28 years old, using Schedule 6 growth tables for Hawke’s Bay/Southern North Island and entered into the ETS in 2013 as a single CAA, and with carbon valued at \$25/tonne

The difference that timing makes

The Act clearly distinguishes between pre-1990 and post-1989 forests. Post-1989 forests contribute to the reduction of greenhouse gases (GHGs) under the Act. As Figure 1 shows, over their life-cycle, forests planted post-1989 always store carbon. For administrative purposes, commitment periods are usually for five years with the first commencing January 2008. Participants must submit MERs at the end of each commitment period. There are three implications of this regime:

- Forest owners have no claim on the sequestered carbon from prior commitment periods – these are always claimed by the state
- The full burden on the reduction in carbon stock is assigned to one commitment period. There is no sharing of the carbon stock reduction between the claimants of the carbon – the participant always bears the cost
- Funding the state’s share of first rotation residuals is a first charge deduction from the allocated units

and from the number of units that can be claimed by the participant on the second rotation crop.

For the participant, this regime provides two contradictory messages. On the one hand their investment has contributed to efforts to reduce GHGs, while on the other they are emitters who must pay the full cost of the emissions calculated in a MER period.

The requirements under section 189 of the Act relate to the whole carbon stock from the date of planting and continue to the harvest and decay of residuals, and on to the planting and growth of the second crop. The impact of these requirements on the CAA is that for the first nine years after harvest the participant must forgo units to fund the state’s share of the carbon stock in the residuals, as shown in Figure 2. An example of this calculation is given in Table 1, which shows that for a 300 ha forest entered as a single CAA in 2013 (with 100 ha logged in 2017), despite allocations of units for the first four years all allocated units must be returned in the fifth year. This is an odd result, given there exists a standing forest in 2018 of 200 ha that has sequestered 30,400 tonnes of carbon over the five-year period.

Table 1: Example calculation of carbon stock change over the 2013–2017 mandatory return period*

Return	Year	Area (ha)	Plant (year)	Harvest (year)	Age	Tree stock	Residual stock	Total	Change	VER	Balance
Voluntary	2013	300	1990		23	195,000		195,000	9,900	9,900	9,900
Voluntary	2014	300	1990		24	204,300		204,300	9,300	9,300	19,200
Voluntary	2015	300	1990		25	213,600		213,600	9,300	9,300	28,500
Voluntary	2016	300	1990		26	222,300		222,300	8,700	8,700	37,200
Mandatory	2017					153,800	30,330	184,130	38,170	37,200	–
		200	1990		27	153,800					
		100	1990	2017	27		30,330				

* 300 ha *Pinus radiata* planted in 1993, using Schedule 6 growth tables for Hawke’s Bay/Southern North Island, and having entered the ETS in 2013 as a single CAA

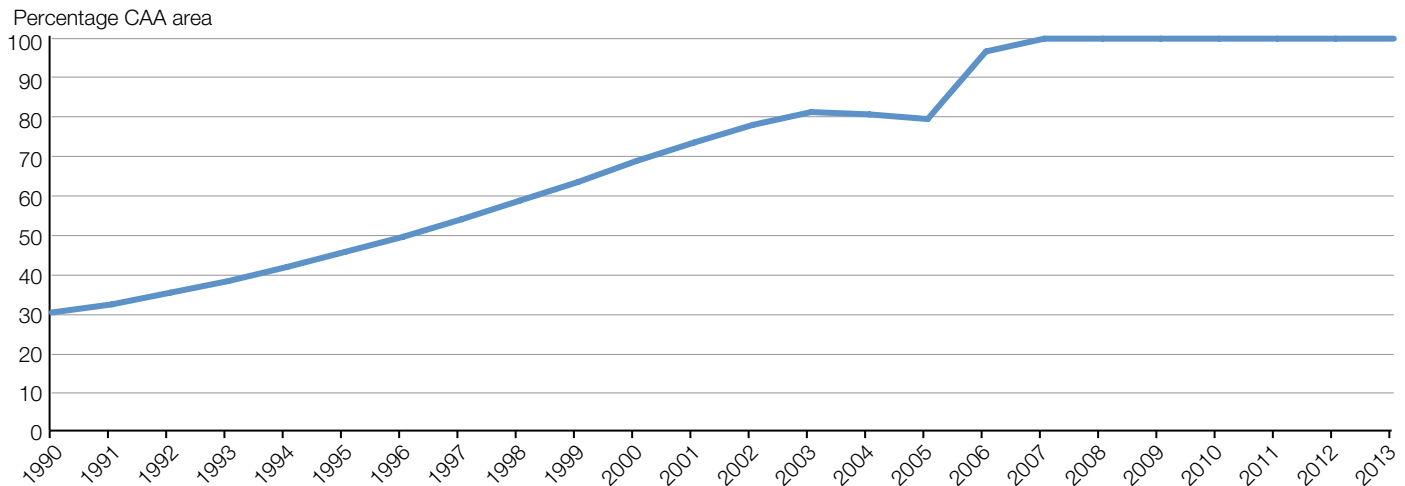


Figure 3: Percentage of a CAA that would result in all units allocated over the 2013–2017 mandatory return period having to be returned

There are two reasons for this result:

- A rigid CAA definition that does not permit the harvested land and its liabilities to be separated from the growing forest that continues to remove carbon
- The stock change accounting method, which delinks the five-year MER period from the growth cycle of the forest.

Inconsistency of a rigid CAA specification with purpose of Act

The purpose of the Act, as it is to be amended by the Climate Change Response (Zero Carbon) Amendment Bill, is the operation and administration of a GHG ETS to give effect to clear and stable climate change policies that ‘contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5° Celsius above pre-industrial levels’ (section 3(1) of the Act)). The conclusion, imposed by the CAA definition, that the forest in 2018 has sequestered no carbon is inconsistent with the fact that there is a 200 ha standing forest. This conclusion under the Regulations, that because a CAA is registered as a larger CAA (rather than many small CAAs) no carbon is sequestered, disincentivises investment in forestry. It also signals to participants that their efforts have contributed nothing to removing carbon from the atmosphere, which is an affront to participants who have made a major contribution to the reduction of New Zealand’s GHGs to date.

Figure 3 shows how perverse the Regulations are. The vertical axis gives the percentage of the area in a CAA that, if logged in 2017, would result in the entire unit allocation to the CAA for 2013–2017 having to be returned. The horizontal axis is the year of planting. The graph shows that harvesting 40% of a 1994 planting would result in the surrender of all the allocated units. The clear conclusion is that the rigid specification a CAA makes no allowance for the practical considerations of logging or the commercial and environmental realities of managing a forest. Instead, it assumes the ability

to predict the future and the preparedness to incur additional costs from accounting for many small CAAs.

Aligning the MER with the forest sequestration cycle

There is also the issue of the state’s share of the carbon in the removed forest. The Regulations require that ‘a ... participant must calculate the emissions or removals from each carbon accounting area ... by determining the carbon stock change in the carbon accounting area ...’ (section 20(1)A of the Act). The operation of this requirement is shown in Figure 4. The example used is a 300 ha forest planted in 1990 (and harvested 1/3rd in 2017, 1/3rd in 2022 and the remainder in 2025) that enters the ETS in 2013 and submits annual returns for the next five MER periods.

Figure 4 shows the units allocated each year. With a rigid CAA specification of the type being applied by Te Uru Rākau in its calculation of voluntary and mandatory returns, referred to as the Rigid-CAA method in this paper, NZUs are allocated in the first four years then surrendered in the fifth year (this is the profile in Table 1). A few units are allocated in the second mandatory return period to 2022. No more units are allocated until 2033 (in the fifth MER), despite having growing forest for the first three MER periods. Units are allocated for the fifth MER as all remnants of the first crop have decayed.

A very different profile is obtained by making the CAA specification flexible to accommodate emerging economic and forest management considerations. This is particularly useful and equitable when land is removed from a CAA or when boundaries or species change post-harvest of the first crop. With a flexible CAA, the accounting for emissions is confined to the harvested land, referred to in the rest of the paper as the Flexi-CAA method.

Figure 4 shows the unit balance calculated under this method. Clearly seen is the familiar saw tooth profile as forest is harvested. The shaded area shows that the difference between the unit balances calculated using the Rigid-CAA and Flexi-CAA methods is the impact of

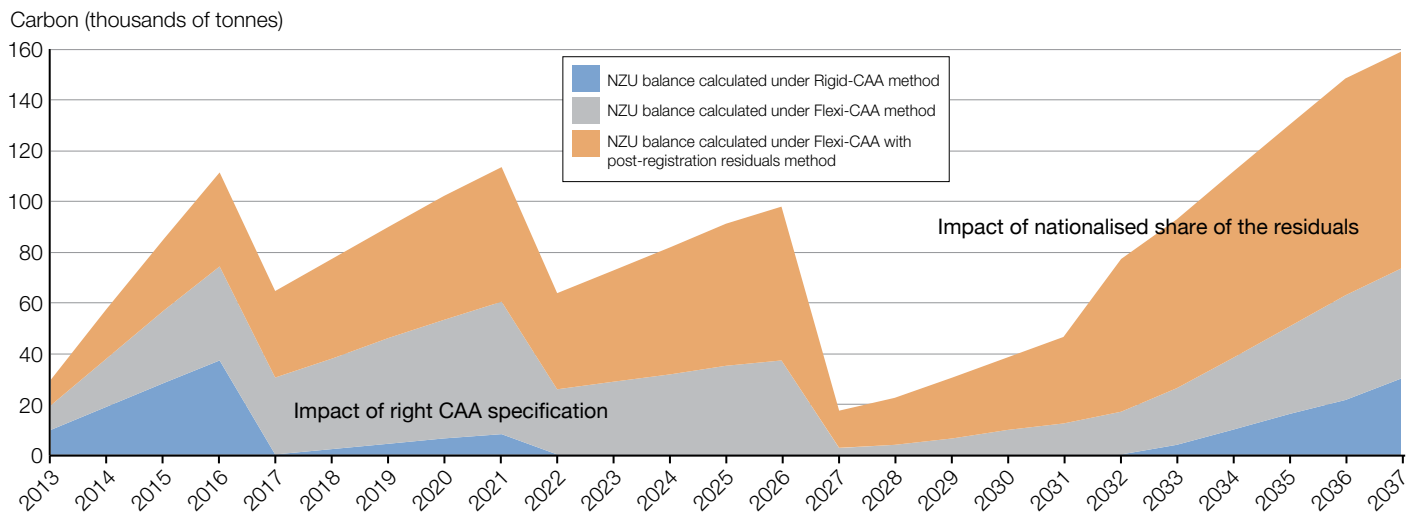


Figure 4: NZU balance calculated using the Rigid-CAA, Flexi-CAA and Flexi-CAA with post-registration residuals method

the rigid CAA specification requiring allocated units to cover liability for a part of the CAA.

Figure 4 also shows the impact of the nationalised share of the residuals on the allocation of units. This is calculated as for the Flexi-CAA method, except the participant accounts only for the residuals in proportion to the time in the ETS. This share of residuals is shown as the shaded triangle in Figure 1 (this method in which the participant shares in the decay of residuals according to the proportion of carbon allocated to the participant is referred to as the Flexi-CAA with post-registration residuals method). The balance of units available to the participant under this method is higher. Of the three methods, this one provides incentives consistent with the purpose of the Act. It does this because by allocating the residuals to the party that gains the benefit of the carbon, and aligns the MER with the time of entry into the ETS in the post-1989 forest life-cycle. The allocation of residuals to the party that benefits from the carbon is an important step in addressing the disincentives provided by the current method of allocating the whole liability for emission on harvest to the participant.

The difference between the three methods in accounting for the carbon content of the forest is shown in Figure 5. The figure shows NZU balances calculated using the three methods as a percentage of forest carbon stock. Over the 25 years covered by the graph, there is a poor alignment between the units allocated under the Rigid-CAA and Flexi-CAA methods and the carbon stock of the forest. Over the period, there is an improving alignment between Flexi-CAA with post-registration residuals method with carbon stock of the forest as the share of the nationalised units in the carbon stock diminishing with the second rotation crop. It is important to note that, for example, even after 25 years of having registered a single CAA there is poor alignment between the units allocated using the Rigid-CAA and Flexi-CAA methods and the carbon stock of the forest.

The burden placed on the participant

Net present value (NPV) is frequently used to assess the relative attractiveness of alternatives. We have previously estimated the cost of participating in the ETS at \$3,150 per annum (Hughes & Molloy, 2017). With a 5% annual discount rate for the following calculations,

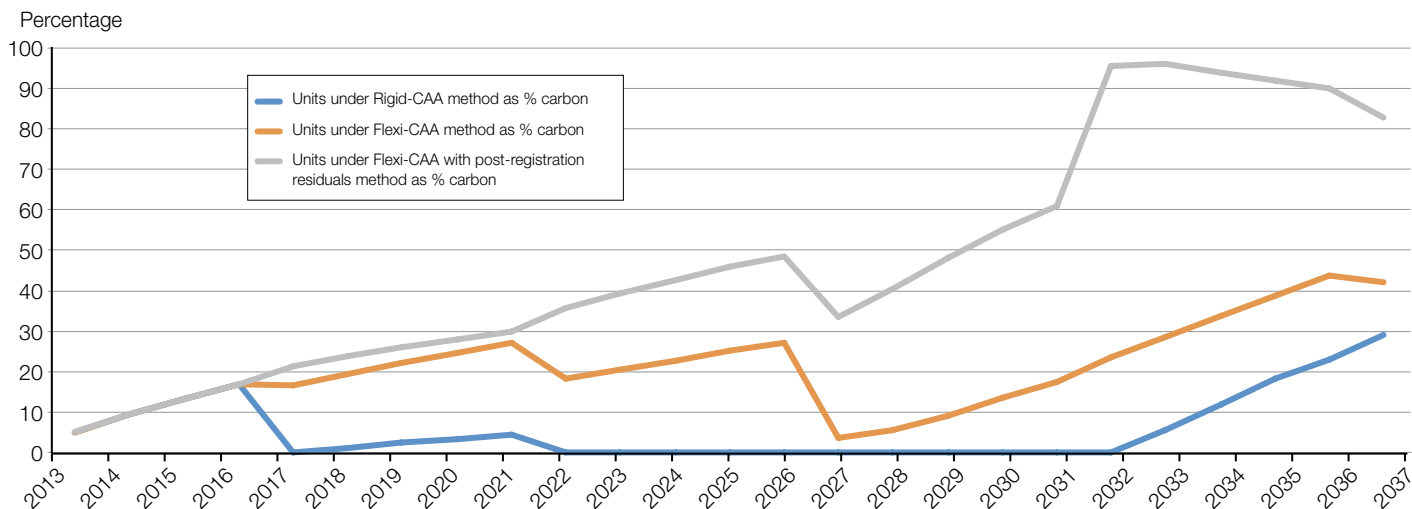


Figure 5: NZU balance as percentage of forest carbon stock calculated using the three methods

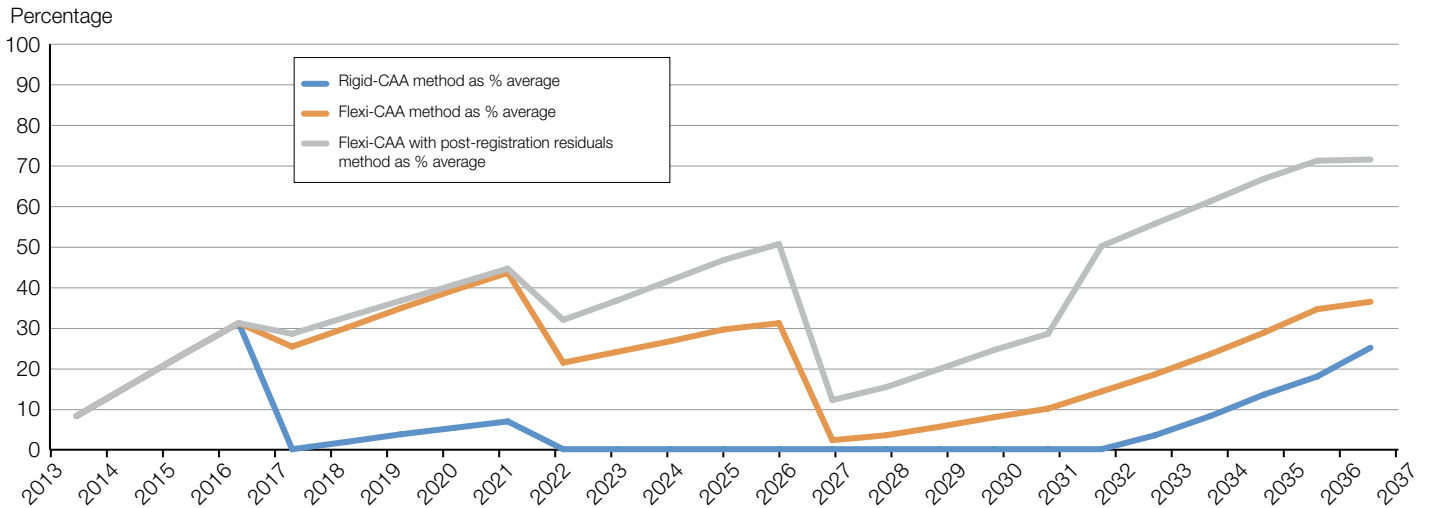


Figure 6: Units allocated by the three methods as a percentage of the average forest carbon with 28-year rotation

and continuing with the example given above and assuming a carbon price of \$25/tonne, the NPV of the NZUs allocated under the Rigid-CAA method is \$338/ha from those participating in the ETS.

Considering the hazards involved in entering the ETS, the inevitable conclusion is that participating in the ETS provides little improvement to the cash flow profile of investing in forestry. The NPV of the Flexi-CAA method is \$1,407/ha. In contrast, over this same period the present value under the Flexi-CAA with post-registration residuals method is \$2,317/ha. This method makes participation in the ETS a valuable contribution to improving the economic returns on forestry. These returns increase with an increase in the price of carbon.

Given the intent of the Government to move towards the averaging method, the application of the Rigid-CAA and even the Flexi-CAA methods seems to be retrograde. Figure 6 shows the units allocated by the three methods as a percentage of the average forest carbon with a 28-year rotation. Over the 25 years covered in the graph, only the Flexi-CAA with post-registration residuals method gets close (at 71%) to the average carbon stock of the forest.

Implications for participants

The Rigid-CAA method gives the state two bites at the sequestered carbon in a post-1989 forest: first, the unclaimed units on the first rotation; and second, the claim on the nationalised share of the residuals for the second rotation. The inescapable conclusion is that the current arrangements provide a strong disincentive to participants in the ETS, and the disincentive increases with the age of the forest. Note that these comments apply to existing participants and the first rotation where forest owners have limited benefit and significant liability. Late entrants with new plantings obtain proportionally more benefit, even under the current accounting method. This has implications for land value.

Figure 7 shows the cost of residuals imposed by the Rigid-CAA method on participants by year of planting

with entry into the ETS on 1 January 2013 and harvest at age 28. This cost is \$7,095 for forest planted in 1990 reducing to \$3,177 for forest planted in 2000 where carbon is priced at \$25/tonne. The situation is even more unattractive at higher carbon prices (e.g. the corresponding values where carbon is priced at \$35/tonne are \$9,934 for 1990 forest and \$4,447 for 2000 forest). To put these costs into perspective, forest land is typically valued in the range of \$3,000 to \$7,000/ha. Given that the bulk of post-1989 forests are planted prior to 2000, most of this land on harvest is severely impaired by entry into the ETS.

The impairments imposed by the Rigid-CAA method have significant ramifications for land value and future land sales. To give an idea about the way that it impacts on freehold rights, Table 2 shows the implications on the ability to sell land. Low interest (below say 5% per annum) with low impairment has little impact on land value. At a high level, with high interest rates (say more than 10% per annum) the strategy is to sell early to minimise loss (as assessed in present value terms). A quite different strategy applies where the land is highly impaired. In broad terms it means where interest rates are low (holding until residuals are zero before selling becomes optimal), and at high interest rates, it changes to hold to minimise the loss on sale. The inevitable conclusion is that to shed the impediments on the options to sell or change land use, participants must deregister. This finding has implications for the sale and purchase of cut-over forest land, and whether it continues as forest land.

Table 2: How entering the ETS under Rigid-CAA method impacts the ability to sell land

Impairment on land	Interest rate	
	Low	High
Low	Sell close to land value	Sell early to minimise loss
High	Hold until residuals are zero	Hold to minimise loss

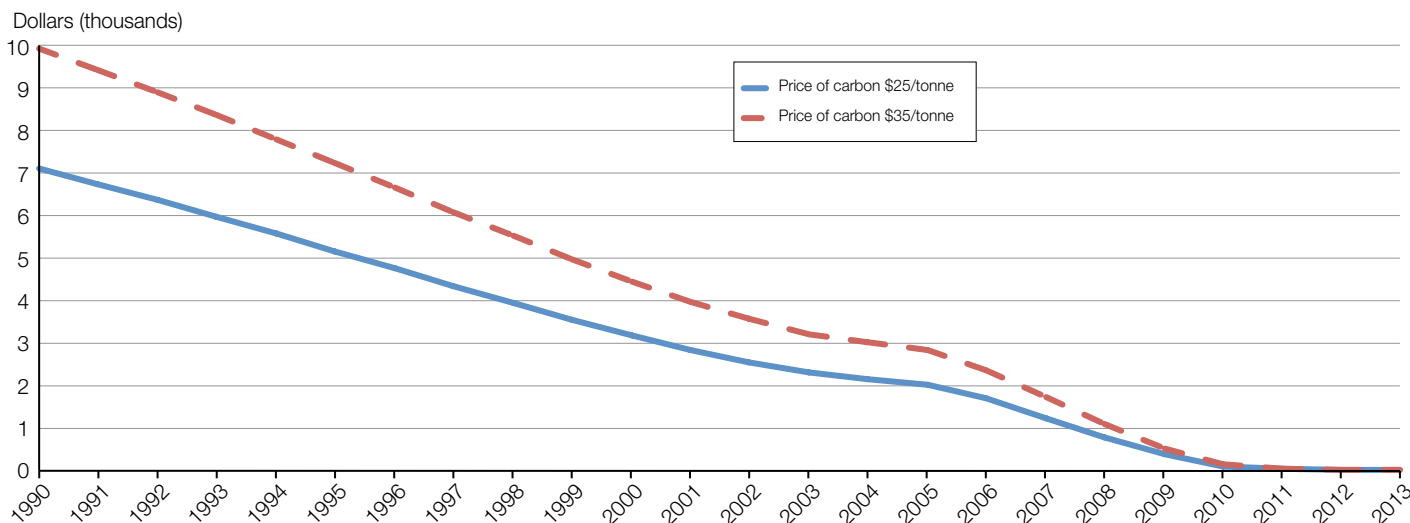


Figure 7: Cost of residuals imposed by the Rigid-CAA method on participants by year of planting with entry into the ETS in 2013 and harvest at age 28 (\$/ha) where carbon is priced at \$25 and 35/tonne

The harvest residue liability from first rotation may be equivalent to normal forest land value, which is a huge disincentive to sale. It encourages the purchase of clean alternate qualifying land, particularly hill country farmland. The NPV of a combination of a potential One Billion Tree subsidy and liability-free carbon on new land is a market indicator that renders post-harvest cut-over relatively worthless, and is a trigger for land use change from agriculture. That may be a problem for many participants whose ownership is by limited qualifying company or partnership from the 1990s planting boom and who wish to exit post-harvest.

Risk profile for participants

The ETS has been supported by, and has relied on, the initial pioneers and investors in the small-scale forest industry. Yet they are the ones at a serious disadvantage. They have been forsaken by flawed legislation, government inaction, and by proposed changes that favour new entrants. Delays in implementing proposed changes have caused uncertainty, confusion and lack of confidence, and fail to reward existing participants. New entrants under the new accounting method are gifted 18 years worth of 'free' carbon, whereas existing participants under existing accounting are gifted 18 years worth of carbon liability.

Participants have an adverse risk profile, compounded by a carbon pricing model and a market that is very difficult to predict. The price is more strongly influenced by government policy and climate change initiatives than supply and demand (i.e. carbon pricing is not subject to normal market forces).

There is too much downside with not enough upside. For example, a significant number of participants who deregistered when the opportunity was available in the second commitment period have not re-registered as the perceived costs outweigh the benefits. This is for forest owners with experience in the ETS.

To illustrate the inconsistencies in the ETS as they apply to existing participants, with compliant

forests planted post-1989 and registered in the ETS on or before 2018, we have used *Pinus radiata* with the growth profile as set out in Schedule 6 for Hawke's Bay/Southern North Island. Forests with faster growth rates, and therefore the best-performing forests, will be more severely impacted and vice versa. It is beyond the scope of this paper to estimate the scale of this problem, but suffice to say we are aware that many forest owners face the impacts we describe in this paper.

Conclusion

This paper looks at the cost imposed by Te Uru Rākau's application of the Regulations by fixed specification of the CAA, and a MER period unaligned with the forest life-cycle. We argue that the current application is inconsistent with the purpose of the Act, and does not facilitate a transition to the averaging method. Te Uru Rākau already has practices that allow for the flexible removal of land from a CAA and this could be applied to enable a cost-effective method of operating within a single CAA.

The problem described in this paper does not exist under the averaging method. Given the significance of the financial burden being placed on some forest owners, forcing existing participants to wait until 2021 for some unknown action (Te Uru Rākau, 2019, 4) is comparable to Nero fiddling while Rome burns. We recommend that as an interim step Te Uru Rākau apply the Flexi-CAA with post-registration residuals method for both voluntary and mandatory returns. This change should be made immediately and made available to participants who have filed 2017 mandatory returns.

The current application of the Regulations has some significant inconsistencies, provides ambiguous incentives to continue to invest in forestry, and does not provide a transition path to the averaging method. Allowing this situation to continue only signals to current and future participants that 'you can't trust the Government on forestry policy.' The Government has also

announced transitional measures for agriculture outside of the ETS. Clearly the ETS is not working for all emitters. A total rewrite of the Act and Regulations is required to accommodate the characteristics of biological systems, rather than assuming they are a form of an inanimate manufacturing system. Alternative proposals will dilute the ETS as the absolute answer to carbon neutrality. Failure to account for the unique characteristics of forestry management will diminish the significant contribution forestry is making to New Zealand's actions to remain within the '1.5° Celsius' target.

References

Hughes, R. and P. Molloy. 2017. Is the ETS Worth the Carbon it is Written on for Small-Scale Forest Owners? *New Zealand Journal of Forestry*, 61(4): 33–36.

Ministry for Primary Industries (MPI). 2019a. *Emissions Trading Scheme Forestry Accounting Proposals: Regulatory Impact Assessment*. MPI Paper No: 2019/01. Wellington, NZ: MPI.

Ministry for Primary Industries (MPI). 2019b. *Emissions Trading Scheme Reviews*. Available at: www.mpi.govt.nz/protection-and-response/environment-and-natural-resources/emissions-trading-scheme/emissions-trading-scheme-reviews/ accessed 18 October 2019.

New Zealand Productivity Commission (NZPC). 2018. *Low-Emissions Economy*. Wellington, NZ: NZPC.

Te Uru Rākau. 2019. *A Better Emissions Trading Scheme for Forestry*. Te Uru Rākau Discussion Paper No: 2019/01. Wellington, NZ: Te Uru Rākau.

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