New Zealand Institute of Forestry (NZIF)
Te Pūtahi Ngāherehere o Aotearoa Inc

The ETS and Forest Valuation

Guidance notes for carbon valuation standard

Exposure Draft
July 2024

Guidance Notes

Background

Carbon credits generated via sequestration projects may be used for carbon offsetting or carbon insetting. Carbon offsetting allows a carbon emitter to purchase carbon credits from a project they don't own or operate, whereas carbon insetting involves an emitter funding their own carbon avoidance or removal projects, without transacting on a carbon market.

Carbon offsets generated via sequestration projects may be sold into either compliance markets: where emitters purchase carbon units to meet legally mandated emissions targets; or voluntary markets: where companies may voluntarily elect to purchase units to offset their emissions.

These standards and guidance notes relate to New Zealand Emission Units (NZUs) regulated under the New Zealand Emissions Trading Scheme (ETS), the compliance market established for the trade of carbon offset units generated in New Zealand.

Global carbon markets continue to evolve and further consideration of carbon units sold into voluntary markets or carbon insets generated within companies may be warranted.

Land Differentiation
The Emissions Trading Scheme (ETS) became effective for forestry from 1 January 2008.

To qualify as forest land in the ETS, the forest must:

- cover at least 1 hectare in area;
- contain species that can reach at least 5 metres in height when mature in that location;
- have (or be expected to reach) crown cover of more than 30% in each hectare; and
- be at least (or expected to reach) 30 metres across on average.

The ETS distinguishes land that was occupied by forest before and after 31st December 1989:

- **Pre-1990 forest land** is forest land that was forest land on 31 December 1989; remained as forest land on 31 December 2007; and where the forest species on the forest land on 31 December 2007 consisted predominantly of exotic forest species.

- **Post-1989 forest land** is primarily forest land that was established in exotic or indigenous forest species **after** 31 December 1989 on land that was not forest land on 31 December 1989.

The effect of the ETS on the valuation of a forest (land and crop) is determined by whether the forest land is pre-1990 or post-1989. The focus here is **valuation of a forest on post-1989 forest land.**

Carbon accounting in the ETS

From the perspective of carbon accounting there are three different categories of post-1989 forest land[1]:

1. Forest land registered before 1 January 2023 with stock change accounting
2. Forest land registered from 1 January 2019 with averaging accounting
3. Forest land registered as permanent forestry from 1 January 2023 with stock change accounting.

Production forestry with stock change approach

The stock change approach applies to forest land registered in the ETS between 1 January 2008 and 31 December 2022. Forest land registered between 1 January 2019 and 31 December 2022 may have been changed to averaging accounting prior to 30 June 2023.

Production forestry with averaging approach

Forest land registered in the ETS From 1 January 2023 must use averaging accounting, unless the forest is registered into the permanent forestry category.

Permanent forestry

The permanent forestry category was available from 1 January 2023 for forests that won't be clearfelled for at least 50 years. Stock change accounting will be used for forest land registered in the ETS as permanent forestry.

The 'permanent post-1989 forest' category is available for both exotic and indigenous forests that will not be clearfelled for at least 50 years after they are registered in the ETS.

When the 50-year non-clearfell period expires the participant has 3 options:

- Sign up for another 25 years and continue to earn units on the stock change approach. This choice will occur again every 25 years after that date.
- Transition to averaging accounting and surrender some units back down to the average age for the forest type. Harvesting is permitted as long as there is replanting.
- Remove the forest from the ETS and surrender the carbon unit balance for the area removed.

[The regulations above have been evolving and may change. The descriptions above are correct as at 1 May 2024. Members should check for any changes to regulations]

[1] For details on carbon accounting refer to https://www.mpi.govt.nz/forestry/forestry-in-the-emissions-trading-scheme/emissions-returns-and-carbon-units-nzus-for-forestry/accounting-for-carbon-in-the-ets/

1. Definition

The target of valuation is an estimate of the market value of the future carbon trading opportunity. If a participant has filed an emissions return and received units, these units have value. However, they are not part of the 'bundle' being valued here. They are a separate asset (commonly reported in company financial standards as an intangible asset).

An emissions return is required when ownership of post-1989 land changes. This will cover carbon units earned since the last emissions return. However, at the time of a transaction, these units may not have been received. In some cases, these units may be transferred with the sale.

Carbon units that, at the date of the valuation, have been:

- received following filing an emissions return, or
- earned[2] but not yet received,

should not be included in the value of the carbon trading opportunity.

It is important to avoid confusion over who is valuing which components of value. This requires an overview of:

- any inherited liability (units received and sold that subsequently need to be surrendered);
- NZU holding account balance (i.e. units received and retained);
- units earned but not yet received;
- future units that will be earned and received (and any liability associated with them).

The asset (or liability) being valued in this standard is the last category, i.e. the carbon trading opportunity from the settlement date (real or notional) forward. However, the number of carbon units in the other categories should also be documented. It may be a condition of sale and purchase that the vendor has to transfer these units to the purchaser or agree to hand them over in the future.

[2] According to carbon accounting methodology (whether using stock change or averaging approaches), carbon stock is not deemed to increase until trees reach the next age on 31 December of the year. The carbon stock increase for the current year will still be considered as part of the trading opportunity, unless the valuation date falls on December 31st, as the carbon won't be earned until that day.

2. Carbon to be valued as a separate asset/liability

Carbon value should be valued as a separate asset/liability rather than as part of land value or part of crop value. Carbon value arises because of the change in carbon stocks associated with the tree crop. However, to accumulate carbon stocks requires use of the land. An argument could be made to include carbon value with either crop value or land value. Future carbon value, where the forest is yet to be registered in the ETS, is normally accounted for in land value. Here it is considered that, because carbon has some unique features, it should be valued as a separate asset/liability at least once ETS registration is confirmed.

Thus, we have:

Land value
+ Current tree crop value
+ Future crop value (2R+)
+ Carbon value
+ Other sources of value

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Forest value

Multiple-rotation valuations of the tree crop may involve estimating the value of both the current tree crop value and future crop value (2R+). However, separation of the two components is possible and is required for financial reporting.

Valuing carbon separately from the land has implications for the valuation of land:

- Prior to afforestation (and ETS registration), land value should be based on transaction evidence.
- After afforestation and ETS registration, valuation of land should be consistent with valuation of the carbon trading strategy and
  - Have the carbon trading opportunity isolated; i.e. 'stripped out'.
  - Reflect the encumbrances placed on land by the scenario used to value the carbon trading opportunity (See section 13 for ETS encumbrances).

Failure to strip out the value of the carbon trading opportunity from the land value while also separately recognising the value of the carbon trading opportunity would result in double counting of carbon's contribution.

In the case of averaging, given the cost to surrender all units received, this means that it is likely that land-use will essentially be committed to forestry. Consequently, the value of pre-1990 land may provide a guide to land value. A challenge may be that there is a paucity of relevant transaction evidence for pre-1990 land.

In the case of permanent forestry, the long duration of the commitment may mean that there is negligible, if any, commercial forest land value. There will likely be a paucity of relevant transaction evidence given that, in most instances, market evidence will include the

commercial value associated with forestry which may not be applicable to land where the tree crop is not intended for harvest.

Forest land registered before 31 December 2022 (with stock change accounting) may have more optionality both in the first rotation and following the first rotation. There is a lower level of safe[3] units (compared to averaging) to surrender in order to change land use. In addition, the second rotation provides a carbon trading opportunity although not until carbon stocks increase above the safe level.

Transitioning

The suggested approach involves a transitioning from the carbon trading opportunity being:

- included in land value prior to afforestation and ETS registration,
- reported separately after afforestation and ETS registration.

It is likely that comparable sales will form the basis of land valuation prior to afforestation and ETS registration while the income approach will be important in carbon valuation afterwards. Changes in the combined land and carbon value may arise in moving from the situation where the plantable area, ETS eligibility and carbon stocks are uncertain to the situation where a tree crop is established, ETS eligibility is known and carbon stocks are confirmed through a standard or participant-specific carbon table.

Afforestation and ETS registration could be a number of years apart. For example, a tree crop could be up to 4-5 years old before registration in a 5-year MERP (Mandatory Emissions Return Period). The appropriate approach for carbon valuation for the period of time between planting and ETS registration will depend on the confidence the valuer has that the land is eligible for the ETS as post-1989 forest land.

Example of transitioning:

Bareland (post-1989) sells for $10,000/ha. The purchaser is intending to establish a production forest with carbon earned under the averaging approach.

- At this point land is valued at $10,000/ha

Stand is 2 years old after afforestation and ETS registration:

- Land is now valued at pre-1990 land value of (say) $3,000/ha
- Carbon is valued at NPV of carbon at this age = $12,000/ha
    - Carbon earned up until year 2 is not included
- Crop value = $1,000/ha
    - If the income approach is used to estimate crop value, a land rental would be included based on land value of $3,000/ha
- Forest value = $3,000/ha + $12,000/ha + $1,000/ha = $16,000/ha

[3] Under the stock change approach, the minimum level of carbon stocks on site following harvesting determines the level of 'safe' units. These are units that do not have to be surrendered providing that the stand is replanted. Under averaging, all units received are 'safe' in the sense that they do not have to be surrendered following harvest providing that the stand is replanted.

3. Method of valuation

The same general approaches that are applied in the valuation of the tree crop (sales comparison, income, cost) should also be applied to the valuation of carbon. The target is the value of the future carbon trading opportunity, defined as what it would sell for in a market transaction.

Given the nature of the carbon trading opportunity the valuer is likely to focus on the sales comparison approach and the income approach rather than the cost approach. While the sales comparison approach may provide a useful reality check on the value of the collective forest resource, it may be difficult to apportion the value between land, tree crop and carbon. Consequently, it is likely that the income approach (using discounted cashflow analysis) will be commonly used to estimate the value of the carbon trading opportunity.

3.1 Estimating carbon value using the income approach

In estimating the NPV of cashflows associated with carbon the general approach should be to

- Estimate, for the relevant carbon accounting approach, the development of total carbon stocks over time for the specified silvicultural regime and site.
- Calculate the annual change in carbon stocks.
- Multiply these by the anticipated carbon price over time to get annual carbon revenue (positive or negative).
- Subtract off any costs associated with carbon trading (including registration, measurement, audit, filing emissions returns, annual fees, commissions).
- Discount net cashflows using an appropriate discount rate.

This same general approach applies to all categories of post-1989 forest land under the ETS. However, there are differences in the nature of the cashflows for each:

Forest land registered before 1 January 2023 with stock change accounting

(a) Clearfelling is intended

An important assumption here is the carbon trading strategy. Possibilities range from assuming that only ‘safe’ carbon is traded through to assuming that all carbon is traded. The former trading strategy (Fig 1a) has similarities to that under averaging while the latter, when clearfelling is intended, creates a situation where, as the rotation progresses, carbon goes from being an asset to becoming a liability (Fig 1b).

There are also carbon earning (and trading) opportunities in the second and subsequent rotations.

(b) Clearfelling is not intended

Under this category there is no requirement to clearfell a stand. Participants with forest land already registered under stock change accounting may have no intention to clearfell. Rather the intention may be to continue receiving carbon units indefinitely (unless there is an adverse event). The cashflows under this situation will likely be similar to those for forest land registered as permanent forestry (discussed below).

[Note: the following examples do not include the $30.25/ha/year annual ETS charge that MPI announced in September 2023 and which is currently under review]

Fig 1: NPV of carbon trading income (for a 7% discount rate) and annual carbon net cashflow under stock change accounting assuming the BOP look-up table and a carbon price of $60/NZU for a 28-year rotation. Graphs show results for two different carbon trading strategies (a) trade only safe units and (b) trade all units. Replanting is assumed.

Forest land registered from 1 January 2019 with averaging accounting

The opportunity to earn (and trade) carbon units is limited to the early portion of the rotation:

- Radiata pine: age 16
- Douglas-fir: age 26
- Exotic softwoods: age 22
- Exotic hardwoods: age 12
- Native (indigenous) forest: age 23

Carbon units cannot be earned in the second and subsequent rotations under averaging.

The NPV of future carbon cashflows tends to decrease (at constant carbon price) with age as carbon units are received and the number of carbon units that are to be received decreases (Fig 2). At age 16 there is no carbon value but there is still an encumbrance on land.

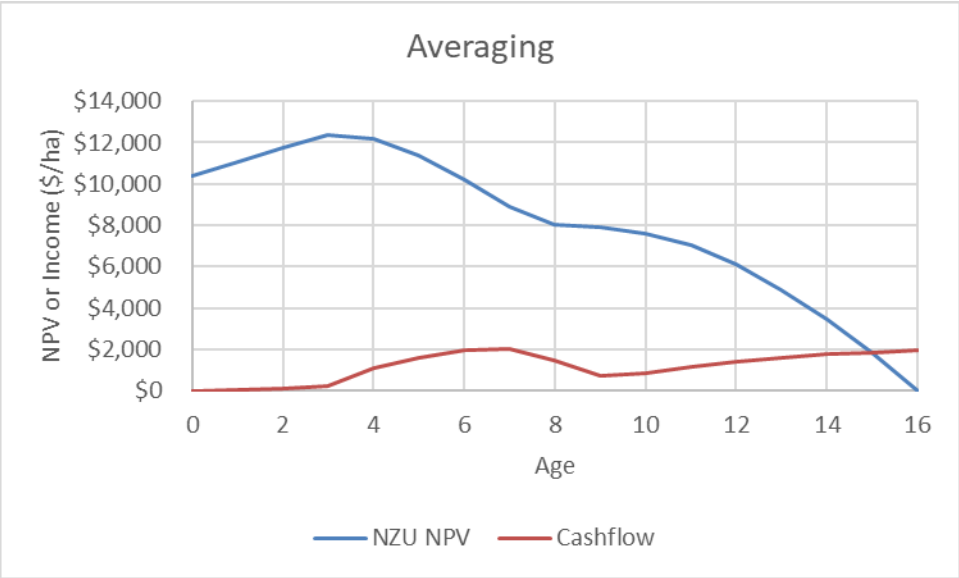

Fig 2: NPV of carbon trading income (for a 7% discount rate) and annual carbon net cashflow under averaging accounting assuming the BOP look-up table and a carbon price of $60/NZU. Replanting is assumed.

Forest land registered as permanent forestry from 1 January 2023 with stock change accounting.

There is the opportunity to earn (and trade) carbon units for at least 50 years (Fig 3).

When the 50-year non-clearfell period expires the participant has (at the time of writing) 3 options:

- Sign up for another 25 years and continue to earn units on the stock change approach. This choice will occur again every 25 years after that date.
- Transition to averaging accounting and surrender some units back down to the average age for the forest type. Harvesting is permitted as long as there is replanting.
- Remove the forest from the ETS and surrender the carbon unit balance for the area removed.

It is important that the option adopted is documented.

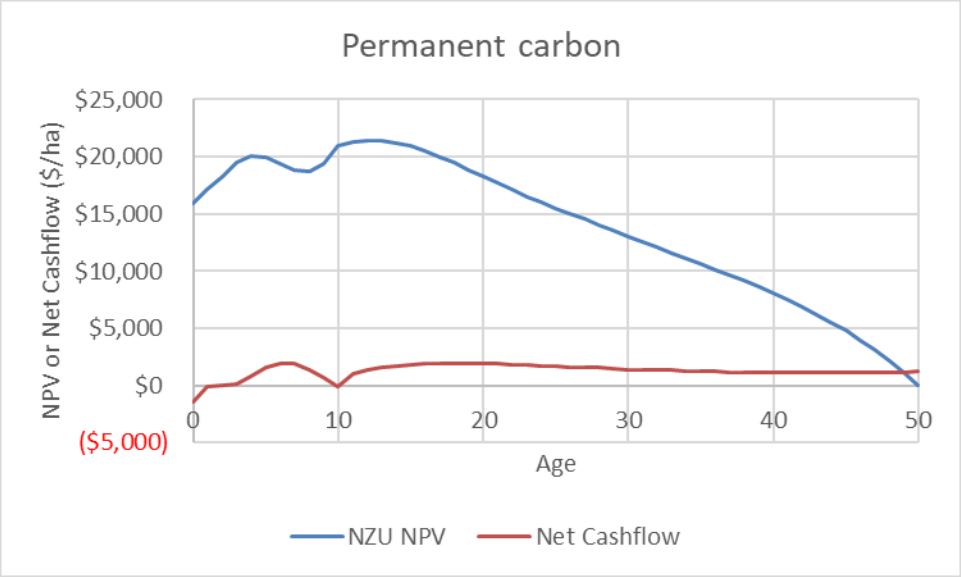

Fig 3: NPV (for a 7% discount rate) and net cashflow for permanent forestry with stock change accounting for an example assuming the BOP look-up table and a carbon price of $60/NZU. Cashflow is the net of revenue from carbon and forestry costs. For the example, the assumptions made for the permanent forestry are that carbon is earned for 50 years with no carbon earned or surrendered after 50 years. With these assumptions there is no clearfelling of the tree crop and, consequently, no tree crop to carry the forestry costs.

4. Consistency

The scope for the valuation of each component (land, tree crop, carbon) needs to be clearly documented and, if done by different parties, collaboration (including consistency of assumptions) is required to achieve market value. An important aspect here is the 'additivity' of components (i.e., no double counting or leaving out components). There is the danger of each valuer considering only their component and not seeing the overall result. This can become more of a problem when each valuer has individual instructions and a client forms their own forest value by indiscriminately combining the components.

5. Reality checks

The valuation objective is the estimation of market value. When valuing a forest (or components of a forest) it is necessary to ensure that the value passes the market value definitions and a reality test; i.e., would the estimated value for the collective forest resource (and each of the components) be demonstrated in a transaction (should the forest, or components of it, actually be marketed) given all the evidence available to the valuer? Would there be a willing buyer and willing seller at the attributed value?

The general approach for valuing carbon should be the same as valuing the tree crop. The valuer should be trying to mimic what is happening in the market rather than what the current owner is doing.

6. Carbon stocks

The method of forecasting future carbon stocks should be disclosed – in particular whether the standard look-up tables or participant-specific carbon tables have been used. Where relevant, the assumed rotation age should be justified.

When models are used to forecast carbon it is important that they be documented along with assumptions including:

- Species
- Area (noting that under ETS mapping standard rules CAA area is not necessarily equal to net stocked area under normal mapping rules)
- Silvicultural regime
- Site productivity

6.1 Rotation age

Including carbon has no impact on optimum rotation age under the averaging approach (provided that harvest age is at least the ETS averaging age for that species; e.g. 16 years for radiata pine). In contrast, carbon has an impact on the optimum rotation age when the stock change approach is used. Optimum rotation age will increase with increasing carbon price. In fact, at a high enough carbon price (and low enough log price), the most profitable option may be to defer harvest.

Valuation assumptions need to be clearly documented and justified. This includes providing any supporting analysis for assumptions about the clearfell rotation age adopted.

Under the stock change approach, the optimum rotation age for any stand within a larger estate will depend on the harvest schedule that combines NPV from both clearfell harvesting plus carbon cashflows. Supporting analysis should be included to support the estate model adopted. It is important to understand the extent of any differences in optimum rotation age if one or other or both carbon and woodflows are considered.

7. Carbon trading strategy

Soon after implementation of the ETS there was anecdotal evidence that some investors may be inclined to a more cautious approach than that permitted under the stock change approach - they were requesting that their valuers examine scenarios that assume the sale of just a 'safe' level of carbon units. This was confirmed by the survey by Manley (2019) that found "the majority of NZ ETS participants have adopted a conservative carbon trading strategy. Although some have a more aggressive strategy and are selling more units, most participants are only selling units that they do not envisage having to repurchase and surrender.[4]"

Under the stock change approach, adjusting the assumed percentage of units traded may have a marked effect on the value attributed to carbon. This points to a need, in the first instance, to explain as thoroughly as possible the market's perspectives on the matter. Any such discussion must address possible differences in the perspectives of those owners with a spread of forest maturity and those whose tree crops have a confined age class distribution. The consequences of different trading levels can and should be tested within appropriate analyses.

8. Carbon price

The same general approach adopted in the NZIF Forest Valuation Standards for log prices (Standard B8) should be applied to carbon prices. The focus should be on disclosure and justification.

[4] Potential impacts of NZ ETS accounting rule changes for forestry – averaging and harvested wood products. MPI Technical Paper No: 2019/14

9. Costs

9.1 Forestry costs

In the case of production forestry (with either the stock change approach or the averaging approach), forestry costs are included in the cashflows to calculate tree crop value (rather than the carbon trading opportunity).

However permanent forestry does not allow clearfelling for at least 50 years. It is possible that the scenario assumed for permanent forestry may not assume clearfelling even beyond 50 years. If this is the case, then there is no tree crop to carry the forestry costs (e.g. establishment and maintenance). Cashflows used to calculate NPV of the carbon trading opportunity for permanent forestry (without clearfelling) need to include these forestry costs (less any net revenues from thinning).

9.2 Carbon costs

All costs associated with carbon should be netted off against the carbon value. This will include:

- direct costs of registration, measurement, audit, filing emissions returns and annual fees;
- commissions on the sale of carbon units; and
- all carbon overhead and administration costs.

10. Land rental

The general principle is that the carbon trading opportunity should carry land rental on the component of land value that exceeds the forestry-only component of land value that is borne by the tree crop.

Under production forestry, if the land value reflects only the forestry potential of the land and does not include any component of carbon value (e.g. pre-1990 land value), there is no additional land rental associated with the carbon trading opportunity.

The advantage of this approach is that two identical tree crops will have the same value regardless of whether or not they are in the ETS. The disadvantage of this approach is that it does not recognise that currently almost all land being acquired for afforestation is motivated by carbon trading opportunities under the ETS.

In the case of production forestry under averaging accounting, there is no carbon trading opportunity in the second or subsequent rotations. Given the approach adopted in this Standard, after afforestation and ETS registration, the land value reflects only the forestry potential of the land and does not include any component of carbon value. In this case, there is no additional land rental associated with the carbon trading opportunity.

In the case of production forestry under stock change accounting, there is additional optionality regarding carbon trading that may be reflected in land value being greater than pre-1990 land value. The valuation of the carbon trading opportunity should carry land rental on the component of land value that exceeds the pre-1990 land value.

Under permanent forestry, the carbon trading opportunity should carry the full cost of land rental unless there is separate estimation of tree crop value.

When the valuer of the tree crop or carbon is estimating a market land rental, they should liaise with the land valuer to ensure that the rental and the land value are aligned (in situations where a land valuation is being carried out as well). In the case of production forestry under stock change accounting, there should also be discussion between the land valuer and valuer of the tree crop or carbon around partitioning of rental streams for crop and carbon valuations.

11. Discount rate

There is every likelihood that the discount rate used for valuing carbon cashflows will be different from that used for the timber component. Capital Asset Pricing Model theory, for instance, tells us that the cost of capital should be specific to the investment project, and not to the investment entity.

There is considerable uncertainty surrounding the carbon trading business. The measurement and modelling of carbon quantity has been advancing and shares a common technical footing with the estimation of timber content. In comparison, there is considerable uncertainty associated with:

- Future prices for carbon
- The administrative environment.

There could be an inclination to reflect such uncertainty in a higher discount rate but this, as always, may be unduly simplistic. Ideally, cashflows should be adjusted to allow for uncertainty. The valuer should remain mindful that with stock change accounting, beyond some stand age, increasing the discount rate will increase the carbon value when clearfelling is anticipated.

The discount rate may be different for carbon cashflows and timber growing cashflows. It may also be different for carbon cashflows under the averaging or safe approaches compared to carbon cashflows under the stock change approach. Rates should be derived using all available evidence, including implied discount rates from available transactions, declared discount rates, and WACC/CAPM methodology.

12.Uncertainty

It is a general observation that the discount rate is not the best place to accommodate any and all forms of uncertainty. Not least among the considerations is that selecting a discount rate adjustment with which to proxy uncertainty is generally a poor alternative to directly testing the effect of cashflow adjustments on the NPV.

Factors that invite cashflow-based sensitivity analysis include:

- climatic and pathogenic change of growth rate (assuming the measurement approach)
- catastrophic loss
- movement in carbon price
- change in legislation or regulations

The Temporary Adverse Event exemption available from 2023 covers the first two points to the extent that it can remove the premature surrender of carbon units. However, the final two points warrant attention. They are not independent – changes in legislation or regulations can have an impact on carbon price (and whether there is any revenue opportunity at all).

The ETS legislation has been subject to ongoing review and change. As with any legislation, changes can be expected but it is not the domain of the valuer to anticipate such change as the brief is to assess current value. Nevertheless, the valuer's responsibility in producing fair value is to try to see the situation through the eyes of market participants. If market participants are inclined to factor in some allowance for regulatory uncertainty, then the valuer must do the same.

It is suggested that analysis such as sensitivity or scenario analysis be used to explore the impact of changes in carbon price and potential changes in legislation on carbon value.

12.1 Uncertainty of eligibility

Prior to ETS registration, there may be uncertainty about the eligibility of land. In going from bare land to stocked plantation, uncertainty decreases as:

- A tree crop is successfully established.
- Land is successfully registered; i.e. recognized by MPI as being eligible for the ETS.
- FMA plots are established (in the case of the participant having 100 ha registered) and a PST (Participant Specific Table) is obtained.

Valuers should explicitly state the risk associated with areas that are not yet registered or yield tables that are yet to be established.

13. ETS Encumbrances

For all forest land, default obligations rest with the participant. The participant is not necessarily the landowner. It can instead be a party who does not own the forest land but has legal rights to the forest on the land. Specific examples are registered forestry right holders; registered leaseholders; or parties to a Crown conservation contract. If a registered forestry right holder or registered lease holder wishes to be registered as the Participant, the written permission of the forest landowner is required. In such a case, the landowner is not liable for the obligations of the participant. However, if the land is not withdrawn from the ETS by the participant on termination or expiry of the forestry right or lease, the landowner becomes the participant and is responsible for the unit balances (if any) of the Carbon Accounting Areas.

Owners of pre-1990 forest land that is not exempt land, and any ETS participants occupying post-1989 forest land that enters the ETS, effectively have a contract with the Crown to maintain forest or surrender carbon units. This requirement potentially imposes a financial impost on any owner of such land in the event that the owner wishes to change the land use. This is a form of 'encumbrance'. The size of the 'encumbrance' will vary from property to property based upon the assessed carbon being carried by the tree crop. Participants can apply to offset the deforestation of pre-1990 forest land (or post-1989 averaging land that has reached its average age) by planting a new forest in a different location. An exemption from deforestation liability was also available to applicants with less than 50ha of pre-1990 forest.

Land valuation requires that encumbrances be acknowledged. However, the statutory definition of land value includes the phrase "as if unencumbered by any mortgage or charge thereon". It is therefore important that valuers of forestry land are fully conversant with all of the issues arising from the effect of the ETS on the land being valued.

The nature of the 'ETS encumbrance' differs for pre-1990 forest land and post-1989 forest land. In the case of pre-1990 forest land the 'encumbrance' is that forestry remains the obligatory land use unless carbon units are surrendered or deforestation is offset. This 'encumbrance' is better described as an economic impediment to a land use change. In principle, it will be reflected in the market price of the land as compared to post-1989 land which potentially has an additional income stream arising from the trading of carbon. For post-1989 forest land the owner has a choice whether to enter the scheme or not. The 'ETS encumbrance' is that:

- under the stock change approach, any reduction in carbon stocks requires a corresponding surrender of carbon units.
- under all approaches, a change in land use requires all carbon units that have been received to be surrendered; i.e. a zero unit balance in the NZU holding account.

Once a post-1989 participant is registered under the ETS, a notice is placed on the land title to this effect. The notice states that the title is subject to the CCRA (Climate Change Response Act). This notice is not a legal encumbrance against the land, but it is a notice to a purchaser (valuer) that there may be issues under the ETS regulations that need to be checked to ensure that there is no liability to a purchaser or any interested party which

would detract from the market value of the land. The CCRA notice will state whether it relates to the presence of:

- Pre-1990 forest land that received an allocation of units under the Forestry Allocation Plan (FAP); or
- Pre-1990 forest land that received an exemption from deforestation liability; or
- Post-1989 forest land that is registered in the ETS; or
- Pre-1990 or post-1989 offsetting land.